

Prestige 2002 Series

VoIP Analog Telephone Adaptor

User's Guide

Version 3.60
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Notice 1

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- 3** Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightening.

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Please have the following information ready when you contact customer support.

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

METHOD	SUPPORT E-MAIL	TELEPHONE^A	WEB SITE	REGULAR MAIL
	LOCATION	SALES E-MAIL	FAX	
WORLDWIDE		support@zyxel.com.tw	+886-3-578-3942	www.zyxel.com www.europe.zyxel.com
		sales@zyxel.com.tw	+886-3-578-2439	ftp.zyxel.com ftp.europe.zyxel.com
NORTH AMERICA		support@zyxel.com	+1-800-255-4101 +1-714-632-0882	www.us.zyxel.com
		sales@zyxel.com	+1-714-632-0858	ftp.us.zyxel.com
GERMANY		support@zyxel.de	+49-2405-6909-0	www.zyxel.de
		sales@zyxel.de	+49-2405-6909-99	
FRANCE		info@zyxel.fr	+33 (0)4 72 52 97 97 +33 (0)4 72 52 19 20	www.zyxel.fr
SPAIN		support@zyxel.es	+34 902 195 420	www.zyxel.es
		sales@zyxel.es	+34 913 005 345	
DENMARK		support@zyxel.dk	+45 39 55 07 00	www.zyxel.dk
		sales@zyxel.dk	+45 39 55 07 07	
NORWAY		support@zyxel.no	+47 22 80 61 80	www.zyxel.no
		sales@zyxel.no	+47 22 80 61 81	
SWEDEN		support@zyxel.se	+46 31 744 7700	www.zyxel.se
		sales@zyxel.se	+46 31 744 7701	
FINLAND		support@zyxel.fi	+358-9-4780-8411	www.zyxel.fi
		sales@zyxel.fi	+358-9-4780 8448	

a. "+" is the (prefix) number you enter to make an international telephone call.

Table of Contents

Copyright	3
Federal Communications Commission (FCC) Interference Statement	4
ZyXEL Limited Warranty	5
Customer Support.....	6
List of Figures	11
List of Tables	13
Preface	15
Chapter 1 Introducing the Prestige	17
1.1 Prestige 2002 VoIP Analog Telephone Adaptor Overview	17
1.2 Prestige 2002L VoIP Analog Telephone Adaptor with Lifeline	17
1.3 Features	17
1.4 Applications	19
1.4.1 Make Calls via Internet Telephony Service Provider	19
1.4.2 Make Calls via IP-PBX	20
Chapter 2 Introducing the Web Configurator.....	23
2.1 Web Configurator Overview	23
2.2 Accessing the Prestige Web Configurator	23
2.3 Resetting the Prestige	25
2.3.1 Procedure To Use The Reset Button	25
2.4 Navigating the Prestige Web Configurator	25
2.5 Common Screen Command Buttons	27
Chapter 3 System Screens	29
3.1 System Overview	29
3.2 General Setup	29
3.2.1 Domain Name	29
3.3 General Setup Configuration	29

3.4 Configuring Password	30
3.5 Pre-defined NTP Time Servers List	31
3.6 Configuring Time Setting	32
Chapter 4 Ethernet Screens.....	35
4.1 ETHERNET Overview	35
4.1.1 IP Address and Subnet Mask	35
4.1.2 DNS Server Address Assignment	35
4.1.3 PPPoE Encapsulation	36
4.2 Configuring Ethernet	36
4.3 Configuring the Ethernet Management Port	38
Chapter 5 Introduction to VoIP	39
5.1 Introduction to VoIP	39
5.2 Introduction to SIP	39
5.2.1 SIP Identities	39
5.2.1.1 SIP Number	39
5.2.1.2 SIP Service Domain	39
5.2.2 SIP Call Progression	40
5.2.3 SIP Servers	40
5.2.3.1 SIP User Agent Server	40
5.2.3.2 SIP Proxy Server	41
5.2.3.3 SIP Redirect Server	41
5.2.3.4 SIP Register Server	42
5.2.4 RTP	42
5.3 STUN	42
5.3.1 NAT	42
5.3.2 NAT Types	43
5.3.2.1 Full Cone NAT	43
5.3.2.2 Restricted Cone NAT	44
5.3.2.3 Port Restricted Cone NAT	44
5.3.2.4 Symmetric NAT	45
5.4 SIP ALG	46
5.5 Pulse Code Modulation	46
5.6 Voice Coding	46
5.6.1 G.711	46
5.6.2 G.729	46
5.7 PSTN Call Setup Signaling	46

Chapter 6	
VoIP Screens.....	47
6.1 VoIP Introduction	47
6.2 VoIP Configuration	47
6.3 Advanced VoIP Settings Configuration	48
6.4 Quality of Service (QoS)	51
6.4.1 Type Of Service (ToS)	51
6.4.2 DiffServ	51
6.4.2.1 DSCP and Per-Hop Behavior	51
6.4.3 VLAN	51
6.5 QoS Configuration	52
Chapter 7	
Phone	53
7.1 Phone Introduction	53
7.1.1 Voice Activity Detection/Silence Suppression	53
7.1.2 Comfort Noise Generation	53
7.1.3 Echo Cancellation	53
7.2 Phone Port Configuration	53
Chapter 8	
Phone Book	55
8.1 Phone Book Introduction	55
8.1.1 Speed Dial	55
8.1.1.1 Peer-to-Peer Calls	55
8.1.2 Lifeline (Prestige 2002L)	55
8.2 Speed Dial Configuration	55
8.3 Lifeline Configuration (Prestige 2002L)	57
Chapter 9	
Logs.....	59
9.1 Viewing Logs	59
9.1.1 Log Message Descriptions	60
Chapter 10	
Maintenance	63
10.1 Maintenance Overview	63
10.2 Status Screen	63
10.3 F/W Upload Screen	64
10.4 Configuration Screen	66
10.4.1 Backup Configuration	67
10.4.2 Restore Configuration	67
10.4.3 Back to Factory Defaults	68

10.5 Restart Screen	69
Chapter 11 Troubleshooting	71
11.1 Problems Starting Up the Prestige	71
11.2 Problems with the LAN or PC LED	71
11.3 Problems with the LAN Interface	72
11.4 Problems with Internet Access	72
11.5 Problems with the Password	72
11.6 Problems with the Web Configurator	73
11.7 Problems with Telephone or Telephone Port	73
11.8 Problems with Voice Service	74
Appendix A Hardware Specifications	75
Appendix B Setting up Your Computer's IP Address.....	77
Appendix C IP Subnetting	89
Appendix D PPPoE	97
Index.....	99

List of Figures

Figure 1 Internet Telephony Service Provider Application	20
Figure 2 IP-PBX Application	21
Figure 3 Web Configurator IP Address	23
Figure 4 Enter Password	24
Figure 5 Change Password	24
Figure 6 Web Configurator	26
Figure 7 System General	30
Figure 8 Password	30
Figure 9 Time Setting	32
Figure 10 ETHERNET	37
Figure 11 ETHERNET Mgmt Port	38
Figure 12 SIP User Agent Server	41
Figure 13 SIP Proxy Server	41
Figure 14 SIP Redirect Server	42
Figure 15 NAT	43
Figure 16 Full Cone NAT	44
Figure 17 Restricted Cone NAT	44
Figure 18 Port Restricted Cone NAT	45
Figure 19 Symmetric NAT	45
Figure 20 VoIP	47
Figure 21 VoIP Advanced	49
Figure 22 DiffServ: Differentiated Service Field	51
Figure 23 QoS	52
Figure 24 Phone Port	54
Figure 25 Phone Book	56
Figure 26 Lifeline	57
Figure 27 View Log	59
Figure 28 System Status	63
Figure 29 Firmware Upload	65
Figure 30 Firmware Upload In Process	66
Figure 31 Network Temporarily Disconnected	66
Figure 32 Firmware Upload Error	66
Figure 33 Configuration	67
Figure 34 Configuration Upload Successful	68
Figure 35 Network Temporarily Disconnected	68
Figure 36 Reset Warning Message	69
Figure 37 Restart Screen	69
Figure 38 Windows 95/98/Me: Network: Configuration	78

Figure 39 Windows 95/98/Me: TCP/IP Properties: IP Address	79
Figure 40 Windows 95/98/Me: TCP/IP Properties: DNS Configuration	80
Figure 41 Windows XP: Start Menu	81
Figure 42 Windows XP: Control Panel	81
Figure 43 Windows XP: Control Panel: Network Connections: Properties	82
Figure 44 Windows XP: Local Area Connection Properties	82
Figure 45 Windows XP: Advanced TCP/IP Settings	83
Figure 46 Windows XP: Internet Protocol (TCP/IP) Properties	84
Figure 47 Macintosh OS 8/9: Apple Menu	85
Figure 48 Macintosh OS 8/9: TCP/IP	86
Figure 49 Macintosh OS X: Apple Menu	87
Figure 50 Macintosh OS X: Network	87
Figure 51 Single-Computer per Device Hardware Configuration	98
Figure 52 Prestige as a PPPoE Client	98

List of Tables

Table 1 Web Configurator Screens Summary	26
Table 2 Common Screen Command Buttons	27
Table 3 System General	30
Table 4 Password	31
Table 5 Pre-defined NTP Time Servers	31
Table 6 Time Setting	32
Table 7 ETHERNET	37
Table 8 ETHERNET Mgmt Port	38
Table 9 SIP Call Progression	40
Table 10 VoIP	48
Table 11 VoIP Advanced	49
Table 12 QoS	52
Table 13 Phone Port	54
Table 14 Phone Book	56
Table 15 Lifeline	57
Table 16 View Log	59
Table 17 System Error Logs	60
Table 18 System Maintenance Logs	60
Table 19 SIP Logs	61
Table 20 RTP Logs	61
Table 21 FSM Logs: Caller Side	62
Table 22 FSM Logs: Callee Side	62
Table 23 Lifeline Logs	62
Table 24 System Status	64
Table 25 Firmware Upload	65
Table 26 Restore Configuration	67
Table 27 Troubleshooting the Start-Up of Your Prestige	71
Table 28 Troubleshooting the LAN or PC LED	71
Table 29 Troubleshooting the LAN Interface	72
Table 30 Troubleshooting Internet Access	72
Table 31 Troubleshooting the Password	72
Table 32 Troubleshooting the Web Configurator	73
Table 33 Troubleshooting Telephone	73
Table 34 Troubleshooting Voice Service	74
Table 35 Prestige 2002 Power Adaptor Specifications	75
Table 36 Prestige 2002L Power Adaptor Specifications	76
Table 37 Classes of IP Addresses	89
Table 38 Allowed IP Address Range By Class	90

Table 39 "Natural" Masks	90
Table 40 Alternative Subnet Mask Notation	91
Table 41 Two Subnets Example	91
Table 42 Subnet 1	92
Table 43 Subnet 2	92
Table 44 Subnet 1	93
Table 45 Subnet 2	93
Table 46 Subnet 3	93
Table 47 Subnet 4	94
Table 48 Eight Subnets	94
Table 49 Class C Subnet Planning	94
Table 50 Class B Subnet Planning	95

Preface

Congratulations on your purchase of the Prestige 2002 Series VoIP Analog Telephone Adaptor.



Note: Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Your Prestige is easy to install and configure.

About This User's Guide

This manual is designed to guide you through the configuration of your Prestige for its various applications and provide background information on the Prestige's features.



Note: You may use the web configurator to configure your Prestige.

Related Documentation

- Supporting Disk

Refer to the included CD for support documents.

- Quick Start Guide

The Quick Start Guide is designed to help you get up and running right away. It contains a detailed easy-to-follow connection diagram, default settings, handy checklists and information on setting up your network and configuring for Internet access.

- Web Configurator Online Help

Embedded web help for descriptions of individual screens and supplementary information.

- ZyXEL Glossary and Web Site

Please refer to www.zyxel.com for an online glossary of networking terms and additional support documentation.

User Guide Feedback

Help us help you. E-mail all User Guide-related comments, questions or suggestions for improvement to techwriters@zyxel.com.tw or send regular mail to The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. Thank you.

Syntax Conventions

- “Enter” means for you to type one or more characters. “Select” or “Choose” means for you to use one predefined choices.
- Mouse action sequences are denoted using a comma. For example, “click the Apple icon, **Control Panels** and then **Modem**” means first click the Apple icon, then point your mouse pointer to **Control Panels** and then click **Modem**.
- For brevity’s sake, we will use “e.g.” as a shorthand for “for instance”, and “i.e.” for “that is” or “in other words” throughout this manual.
- The Prestige 2002 series may be referred to as the Prestige or the device in this user’s guide.

Graphics Icons Key

Prestige	Computer	Notebook computer
Server	Switch	Router
Telephone		



CHAPTER 1

Introducing the Prestige

This chapter introduces the main features and applications of the Prestige.

1.1 Prestige 2002 VoIP Analog Telephone Adaptor Overview

The Prestige 2002 is a SIP-based VoIP analog telephone adaptor (ATA). Sending voice signals over the Internet is called Voice over IP or VoIP. Session Initiated Protocol (SIP) is an internationally recognized standard for implementing VoIP.

The Prestige allows you to use a traditional analog telephone to make and receive Voice over IP calls. You can call any landline or mobile telephone as well as IP telephones. You don't need to know if the recipient's connection type is an IP, cellular or landline based service. Calls received from IP telephones work exactly as you would expect from the traditional telephone service.

The Prestige's two Ethernet ports allow you to connect the Prestige to your LAN and connect your computer to the Prestige. This way your computer can still access the LAN without adding an extra Ethernet switch.

The Prestige's web configurator allows easy management and configuration.

1.2 Prestige 2002L VoIP Analog Telephone Adaptor with Lifeline

The Prestige 2002L has all of the features of the Prestige 2002 and adds the PSTN (Public Switched Telephone Network) lifeline feature. PSTN lifeline lets you have VoIP phone service and PSTN phone service at the same time.

1.3 Features

Your Prestige is packed with a number of features that make it flexible and easy to use.

10/100Mbps Auto-negotiating Fast Ethernet Interfaces

The auto-negotiation feature allows the Prestige to detect the speed of incoming transmissions and adjust appropriately without manual intervention. It allows data transfer of either 10 Mbps or 100 Mbps in either half-duplex or full-duplex mode depending on your Ethernet network.

Auto-crossover 10/100 Mbps Ethernet Interfaces

The Ethernet interfaces automatically adjust to either a crossover or straight-through Ethernet cable.

PSTN Lifeline

The Prestige 2002L has a **LINE** port for connecting a PSTN line. You can receive incoming PSTN phone calls even while someone else connected to the Prestige is making VoIP phone calls. You can dial a (prefix) number to make an outgoing PSTN call. You can still make PSTN phone calls if the Prestige 2002L loses power.

REN

A Ringer Equivalence Number is used to determine the number of devices that may be connected to the telephone line. The Prestige can support three devices per telephone port.

Dynamic Jitter Buffer

The Prestige has a built-in adaptive, buffer that helps to smooth out the variations in delay (jitter) for voice traffic. This helps ensure good voice quality for your conversations.

Standards Compliance

The Prestige complies with the following standards.

- SIP version 2 (RFC 3261)
- SDP (RFC 2327)
- RTP (RFC 1889)
- RTCP (RFC 1890)
- SIP NAT Traversal (STUN) (RFC 3489)

Multiple SIP Accounts

The Prestige allows you to simultaneously use multiple voice (SIP) accounts and assign them to one or both telephone ports.

STUN

Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators (STUN) allows SIP to pass through NAT routers.

Multiple Voice Channels

The Prestige can simultaneously handle multiple voice channels (telephone calls). Additionally you can answer an incoming phone call on a VoIP account, even while someone else is using the account for a phone call.

Voice Coding

The Prestige can use the following voice codecs (coder/decoders).

- G.711
- G.729

Voice Activity Detection/Silence Suppression

Voice Activity Detection (VAD) reduces the bandwidth that a call uses by not transmitting “silent packets” when you are not speaking.

Comfort Noise Generation

When the Prestige uses VAD, it generates and sends comfort (background) noise when you are not speaking.

Echo Cancellation

The Prestige supports G.168, an ITU-T standard for eliminating the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.

QoS (Quality of Service)

Quality of Service (QoS) mechanisms help to provide better service on a per-flow basis. The Prestige supports Type of Service (ToS) and Differentiated Services (DiffServ). This allows the Prestige to tag voice frames so they can be prioritized over the network.

Fax Tone Detection and Pass-through

The Prestige automatically detects fax messages and sends them over PCM G.711.

Auto-provisioning

Auto-provisioning automatically updates your Prestige’s configurable settings via a TFTP server.

Firmware Upgrades

Use the web configurator to upload updated firmware to your Prestige.

Ease of Installation

Your Prestige is designed for quick, intuitive and easy installation. Physically, its compact size and lightness make it easy to position anywhere in your busy office.

1.4 Applications

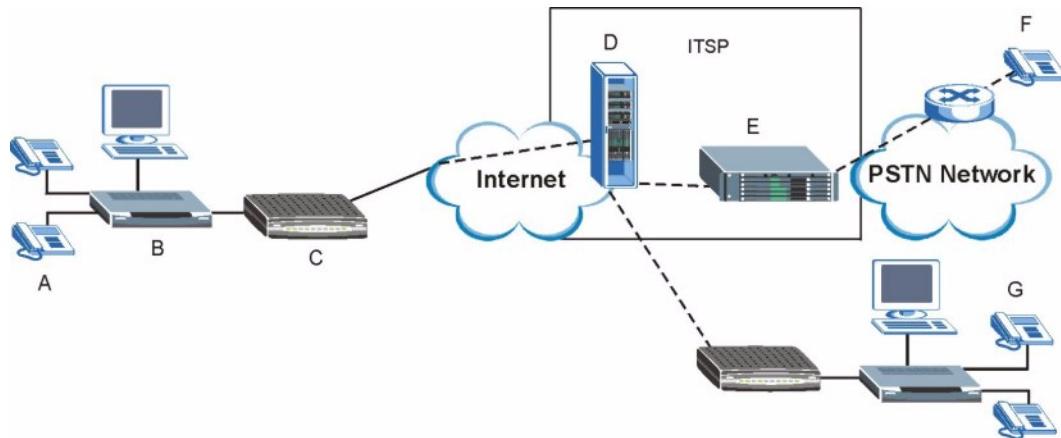
Here are some examples of how you can use your Prestige.

1.4.1 Make Calls via Internet Telephony Service Provider

In a home or small office environment, you can use the Prestige to make and receive VoIP telephone calls through an Internet Telephony Service Provider (ITSP).

The following figure shows a basic example of how you would make a VoIP call through an ITSP. You use your analog phone (A in the figure) and the Prestige (B) changes the call into VoIP. The Prestige then sends your call through your modem or router (C) to the Internet and the ITSP's SIP server. The VoIP call server forwards calls to PSTN phones (F) through a trunking gateway (E) to the PSTN network. The VoIP call server forwards calls to IP phones (G) through the Internet.

Figure 1 Internet Telephony Service Provider Application

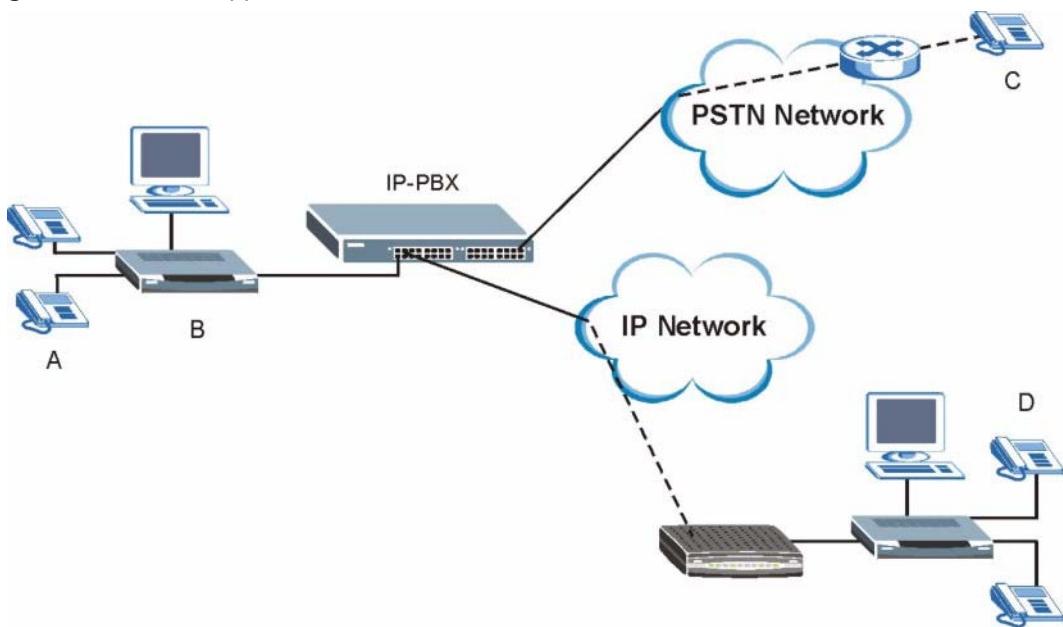


1.4.2 Make Calls via IP-PBX

If your company has an IP-PBX (Internet Protocol Private Branch Exchange), you can use the Prestige to make and receive VoIP telephone calls through it.

In this example, you use your analog phone (A in the figure) and the Prestige (B) changes the call into VoIP and sends it to the IP-PBX. The IP-PBX forwards calls to PSTN phones (C) to the PSTN network. The IP-PBX forwards calls to IP phones (D) through an IP network (this could include the Internet).

Figure 2 IP-PBX Application



CHAPTER 2

Introducing the Web Configurator

This chapter describes how to access the Prestige web configurator and provides an overview of its screens.

2.1 Web Configurator Overview

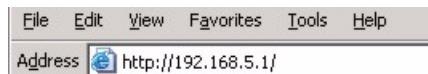
The embedded web configurator allows you to manage the Prestige from anywhere through a browser such as Microsoft Internet Explorer or Netscape Navigator. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions with JavaScript enabled.

It is recommended that you set your screen resolution to 1024 by 768 pixels.

2.2 Accessing the Prestige Web Configurator

- 1 Make sure your Prestige hardware is properly connected and prepare your computer/computer network to connect to the Prestige (refer to the *Quick Start Guide*).
- 2 Launch your web browser.
- 3 Enter the Prestige's management IP address (default 192.168.5.1) or IP address. The Prestige 2002 has a management IP address feature since by default the Prestige is set to receive a dynamically assigned IP address and thus has no default IP address. Whether you use the Prestige's management IP address or its IP address (after it receives one), make sure that your computer's IP address is in the same subnet.

Figure 3 Web Configurator IP Address



- 4 Type "1234" (default) as the password and click **Login**. In some versions, the default password appears automatically - if this is the case, click **Login**.

Figure 4 Enter Password



- 5** You should see a screen asking you to change your password (highly recommended) as shown next. Type a new password (and retype it to confirm) and click **Apply** or click **Ignore**.

Figure 5 Change Password



- 6** You should now see the web configurator **MAIN MENU** screen (see [Figure 6](#)).



Note: The Prestige automatically logs you out if the management session is idle for five minutes. Simply log back in if this happens to you.

2.3 Resetting the Prestige

If you forget your password or cannot access the web configurator, you will need to reload the factory-default configuration file or use the **RESET** button the back of the Prestige. Uploading this configuration file replaces the current configuration file with the factory-default configuration file. This means that you will lose all configurations that you had previously. The password will also be reset to “1234”.

2.3.1 Procedure To Use The Reset Button

Make sure the **PWR/VoIP** LED is on (not blinking) before you begin this procedure.

- 1 Press the **RESET** button for five to ten seconds (release it when the **PWR/VoIP** LED begins to blink). When the **PWR/VoIP** LED starts blinking, the defaults have been restored and the Prestige restarts. Otherwise, go to step 2.
- 2 Disconnect and reconnect the Prestige’s power.
- 3 Wait for the PWR LED to stop blinking and stay on steady.
- 4 Press the **RESET** button for five to ten seconds (release it when the **PWR/VoIP** LED begins to blink). When the **PWR/VoIP** LED starts blinking, the defaults have been restored and the Prestige restarts. Otherwise, go to step 2.

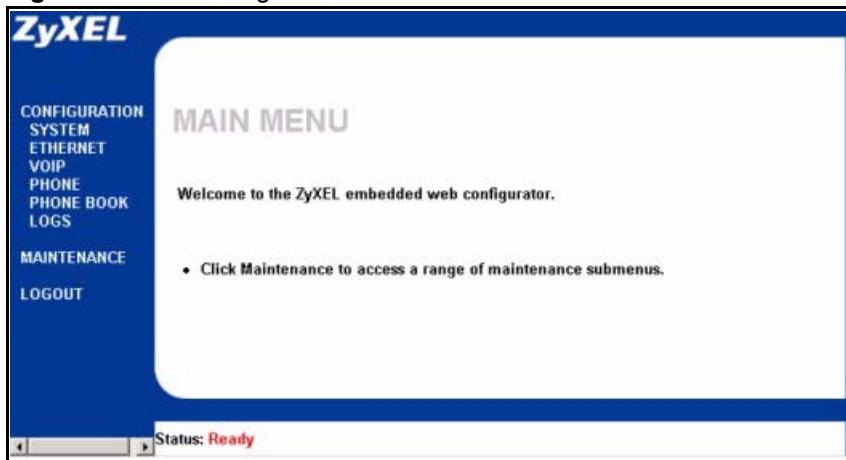
2.4 Navigating the Prestige Web Configurator

The following summarizes how to navigate the web configurator from the **MAIN MENU** screen.



Note: Click the Help icon (located in the top right corner of most screens) to view online help.

- Click a link under **ADVANCED** to configure Prestige features.

Figure 6 Web Configurator

The following table describes the sub-menus.

Table 1 Web Configurator Screens Summary

LINK	TAB	FUNCTION
SYSTEM	General	Use this screen to configure general system settings.
	Password	Use this screen to change your password.
	Time Setting	Use this screen to change your Prestige's time and date.
ETHERNET	Ethernet	Use this screen to configure your Prestige's Ethernet interface settings.
	MGNT	Use this screen to configure your Prestige's management IP address.
VOIP	VoIP	Use this screen to configure your Prestige's Voice over IP settings.
	QoS	Use this screen to configure your Prestige's Quality of Service settings.
PHONE	Phone Port	Use this screen to configure your Prestige's phone settings.
PHONE BOOK	Speed Dial	Use this screen to configure speed dial for SIP phone numbers that you call often.
	Lifeline	Use this screen to configure your Prestige's settings for PSTN calls (Prestige 2002L only).
LOGS	View Log	Use this screen to view the logs.
MAINTENANCE	Status	This screen contains administrative and system-related information.
	F/W Upload	Use this screen to upload firmware to your Prestige
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your Prestige.
	Restart	This screen allows you to reboot the Prestige without turning the power off.
LOGOUT		Click this label to exit the web configurator.

2.5 Common Screen Command Buttons

The following table shows common command buttons found on many web configurator screens.

Table 2 Common Screen Command Buttons

Apply	Click Apply to save your changes back to the Prestige.
Reset/Cancel	Click Reset or Cancel to begin configuring this screen afresh.

CHAPTER 3

System Screens

This chapter provides information on the System screens.

3.1 System Overview

This chapter describes the **SYSTEM** screens.

3.2 General Setup

General Setup contains administrative and system-related information. **System Name** is for identification purposes. However, because some ISPs check this name you should enter your computer's "Computer Name".

- In Windows 95/98 click **Start, Settings, Control Panel, Network**. Click the **Identification** tab, note the entry for the **Computer Name** field and enter it as the **System Name**.
- In Windows 2000, click **Start, Settings** and **Control Panel** and then double-click **System**. Click the **Network Identification** tab and then the **Properties** button. Note the entry for the **Computer name** field and enter it as the **System Name**.
- In Windows XP, click **Start, My Computer, View system information** and then click the **Computer Name** tab. Note the entry in the **Full computer name** field and enter it as the Prestige **System Name**.

3.2.1 Domain Name

The **Domain Name** entry is what is propagated to the DHCP clients on the LAN. If you leave this blank, the domain name obtained by DHCP from the ISP is used. While you must enter the host name (System Name) on each individual computer, the domain name can be assigned from the Prestige via DHCP.

3.3 General Setup Configuration

Click **SYSTEM** in the navigation panel and then **General Setup** to display the following screen.

Figure 7 System General

SYSTEM

General	Password	Time Setting
System Name	<input type="text"/>	
Domain Name	<input type="text"/>	
Administrator Inactivity Timer	5	(minutes, 0 means no timeout)
<input type="button" value="Apply"/> <input type="button" value="Reset"/>		

Table 3 System General

LABEL	DESCRIPTION
System Name	This is for identification purposes. Enter your computer's "Computer Name".
Domain Name	The Domain Name entry is what is propagated to the DHCP clients on the LAN. If you leave this blank, the domain name obtained by DHCP from the ISP is used.
Administrator Inactivity Timer	Type how many minutes a management session can be left idle before the session times out. The default is 5 minutes. After it times out you have to log in with your password again. Very long idle timeouts may have security risks. A value of "0" means a management session never times out, no matter how long it has been left idle (not recommended).
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

3.4 Configuring Password

To change your Prestige's password (recommended), click **SYSTEM** in the navigation panel, and then the **Password** tab. The screen appears as shown. This screen allows you to change the Prestige's password.

Figure 8 Password

SYSTEM

General	Password	Time Setting
Old Password	<input type="text"/>	
New Password	<input type="text"/>	
Retype to Confirm	<input type="text"/>	
<input type="button" value="Apply"/> <input type="button" value="Reset"/>		

The following table describes the labels in this screen.

Table 4 Password

LABEL	DESCRIPTION
Old Password	Type the default password or the existing password you use to access the system in this field.
New Password	Type the new password in this field.
Retype to Confirm	Type the new password again in this field.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

3.5 Pre-defined NTP Time Servers List

The Prestige uses the following pre-defined list of NTP time servers if you do not specify a time server or it cannot synchronize with the time server you specified.



Note: The Prestige can use this pre-defined list of time servers regardless of the Time Protocol you select.

When the Prestige uses the pre-defined list of NTP time servers, it randomly selects one server and tries to synchronize with it. If the synchronization fails, then the Prestige goes through the rest of the list in order from the first one tried until either it is successful or all the pre-defined NTP time servers have been tried.

Table 5 Pre-defined NTP Time Servers

ntp1.cs.wisc.edu
ntp1.gbg.netnod.se
ntp2.cs.wisc.edu
tock.usno.navy.mil
ntp3.cs.wisc.edu
ntp.cs.strath.ac.uk
ntp1.sp.se
time1.stupi.se
tick.stdtime.gov.tw
tock.stdtime.gov.tw
time.stdtime.gov.tw

3.6 Configuring Time Setting

To change your Prestige's time and date, click **SYSTEM** in the navigation panel, then the **Time Setting** tab. The screen appears as shown. Use this screen to configure the Prestige's time based on your local time zone.

Figure 9 Time Setting

The following table describes the labels in this screen.

Table 6 Time Setting

LABEL	DESCRIPTION
Time Protocol	Select the time service protocol that your time server sends when you turn on the Prestige. Not all time servers support all protocols, so you may have to check with your ISP/network administrator or use trial and error to find a protocol that works. The main difference between them is the format. Daytime (RFC 867) format is day/month/year/time zone of the server. Time (RFC 868) format displays a 4-byte integer giving the total number of seconds since 1970/1/1 at 0:0:0. The default, NTP (RFC 1305) , is similar to Time (RFC 868). Select None to enter the time and date manually.
Time Server Address	Enter the IP address or URL of your time server. Check with your ISP or network administrator if you are unsure of this information.
Current Time	This field displays the time of your Prestige. Each time you reload this page, the Prestige synchronizes the time with the time server.
New Time	This field displays the last updated time from the time server. When you select None in the Time Protocol field, enter the new time in this field and then click Apply .

Table 6 Time Setting (continued)

LABEL	DESCRIPTION
Current Date	This field displays the date of your Prestige. Each time you reload this page, the Prestige synchronizes the time with the time server.
New Date	This field displays the last updated date from the time server. When you select None in the Time Protocol field, enter the new date in this field and then click Apply .
Time Zone	Choose the Time Zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Daylight Savings	Select this option if you use daylight savings time. Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
Start Date	Enter the month and day that your daylight-savings time starts on if you selected Daylight Savings .
End Date	Enter the month and day that your daylight-savings time ends on if you selected Daylight Savings .
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

CHAPTER 4

Ethernet Screens

This chapter describes how to configure the Prestige's Ethernet and management IP addresses settings.

4.1 ETHERNET Overview

The Prestige has two Ethernet ports. Connect the **LAN** Ethernet port to a cable/DSL modem or router or an Ethernet LAN switch, which in turn connects you to the Internet or your company's IP-PBX. Connect the **PC** Ethernet port to your computer. The Prestige bridges network traffic between the two Ethernet ports so your computer can still access the Internet or the company LAN. Both Ethernet ports use the same IP address and subnet mask.

4.1.1 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, so too do computers on a LAN share one common network number.

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then the ISP should assign you a dynamic IP address when the connection is established.

Once you have decided on the network number, pick an IP address that is easy to remember, for instance, 192.168.1.20, for your Prestige, but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address.

4.1.2 DNS Server Address Assignment

Use DNS (Domain Name System) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www.zyxel.com is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The Prestige can get the DNS server addresses in the following ways.

- The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, enter them in the **DNS Server** fields.
- If the ISP did not give you DNS server information, leave the **DNS Server** fields set to 0.0.0.0 for the ISP to dynamically assign the DNS server IP addresses.

4.1.3 PPPoE Encapsulation

Point-to-Point Protocol over Ethernet (PPPoE) functions as a dial-up connection. PPPoE is an IETF (Internet Engineering Task Force) draft standard specifying how a host personal computer interacts with a broadband modem (for example DSL, cable, wireless, etc.) to achieve access to high-speed data networks. It preserves the existing Microsoft Dial-Up Networking experience and requires no new learning or procedures.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for instance, Radius). For the user, PPPoE provides a login and authentication method that the existing Microsoft Dial-Up Networking software can activate, and therefore requires no new learning or procedures for Windows users.

One of the benefits of PPPoE is the ability to let end users access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for specific users.

Operationally, PPPoE saves significant effort for both the subscriber and the ISP/carrier, as it requires no specific configuration of the broadband modem at the subscriber's site.

For more information on PPPoE, see [Appendix D](#).

4.2 Configuring Ethernet

Click **ETHERNET** in the navigation panel to display the **ETHERNET** screen. Use the **ETHERNET Ethernet** screen to configure the Prestige's Ethernet interfaces with Internet account information from your ISP. Your ISP may have already configured some of the fields for you.

You can manage the Prestige through the Ethernet IP address, but you may not always know the Prestige's IP address (especially if the IP address is dynamic). Use the **Mgnt Port** screen (see [Figure 11](#)) to configure a static IP address that you use to access the Prestige for management.

Figure 10 ETHERNET

The screenshot shows the 'Ethernet' configuration interface. At the top, there are two tabs: 'Ethernet' (which is selected) and 'Mgmt Port'. Below the tabs, the title 'Ethernet' is displayed. The main area contains the following sections:

- Ethernet TCP/IP Settings:**
 - Get IP Address Automatically:** This option is selected.
 - Use fixed IP address:** This option is available but not selected.
 - IP Address:** A text input field containing '0.0.0'.
 - Subnet Mask:** A text input field containing '0.0.0'.
 - Default Gateway:** A text input field containing '0.0.0'.
 - Primary DNS:** A text input field containing '0.0.0'.
 - Secondary DNS:** A text input field containing '0.0.0'.
- Use PPPoE Client:** A checkbox that is unchecked.
- PPPoE User Name:** A text input field.
- Password:** A text input field.

At the bottom of the screen are two buttons: 'Apply' and 'Reset'.

Table 7 ETHERNET

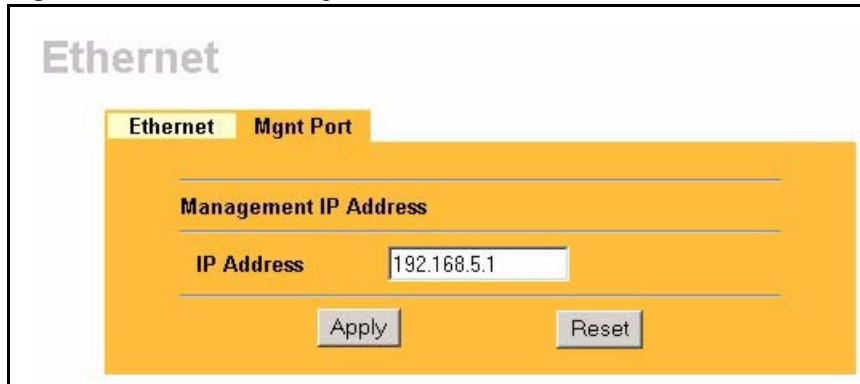
LABEL	DESCRIPTION
Get IP Address Automatically	Select this option if you have a dynamic IP address.
Use Fixed IP Address	Select this option if the ISP assigned you a static IP address.
IP Address	Type the (static) IP address assigned to you by your ISP.
Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
Default Gateway	Enter the gateway IP address assigned to you by your ISP (if given).
Primary/Secondary DNS	DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS servers are extremely important because without them, you must know the IP address of a computer before you can access it. Specify the DNS servers.
Use PPPoE Client	Select Use PPPoE Client if your ISP provides a PPPoE user name and password.
PPPoE User Name	Enter the user name exactly as your ISP assigned it.
Password	Enter the password exactly as your ISP assigned it.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

4.3 Configuring the Ethernet Management Port

Click **ETHERNET** in the navigation panel and then **Mgmt Port** to open the following screen. Use the **ETHERNET Mgmt Port** screen to configure a static IP address through which you can manage the Prestige.

 **Note:** The management port is a separate logical Ethernet interface that you can access from a computer connected to either of the Prestige's physical Ethernet interfaces.

Figure 11 ETHERNET Mgmt Port



The following table describes the labels in this screen.

 **Note:** The management port's subnet mask is fixed at 255.255.255.0.

Table 8 ETHERNET Mgmt Port

LABEL	DESCRIPTION
IP Address	Type the (static) IP address through which to manage the Prestige. This management IP address can be on a different subnet from the Ethernet port's IP address, but the computer you use for management must be on the same subnet as this management IP address.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

CHAPTER 5

Introduction to VoIP

This chapter provides background information on VoIP and SIP.

5.1 Introduction to VoIP

VoIP is the sending of voice signals over the Internet Protocol. This allows you to make phone calls and send faxes over the Internet at a fraction of the cost of using the traditional circuit-switched telephone network. You can also use servers to run telephone service applications like PBX services and voice mail. Internet Telephony Service Provider (ITSP) companies provide VoIP service. A company could alternatively set up an IP-PBX and provide its own VoIP service.

Circuit-switched telephone networks require 64 kilobits per second (kbps) in each direction to handle a telephone call. VoIP can use advanced voice coding techniques with compression to reduce the required bandwidth.

5.2 Introduction to SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering and tearing down of voice and multimedia sessions over the Internet.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

5.2.1 SIP Identities

A SIP account uses an identity (sometimes referred to as a SIP address). A complete SIP identity is called a SIP URI (Uniform Resource Identifier). A SIP account's URI identifies the SIP account in a way similar to the way an e-mail address identifies an e-mail account. The format of a SIP identity is SIP-Number@SIP-Service-Domain.

5.2.1.1 SIP Number

The SIP number is the part of the SIP URI that comes before the "@" symbol. A SIP number can use letters like in an e-mail address (johndoe@your-ITSP.com for example) or numbers like a telephone number (1122334455@VoIP-provider.com for example).

5.2.1.2 SIP Service Domain

The SIP service domain of the VoIP service provider is the domain name in a SIP URI. For example, if the SIP address is 1122334455@VoIP-provider.com, then "VoIP-provider.com" is the SIP service domain.

5.2.2 SIP Call Progression

The following figure displays the basic steps in the setup and tear down of a SIP call. A calls B.

Table 9 SIP Call Progression

A		B
1. INVITE		
		2. Ringing
		3. OK
4. ACK		
	5. Dialogue (voice traffic)	
6. BYE		
		7. OK

- 1** A sends a SIP INVITE request to B. This message is an invitation for B to participate in a SIP telephone call.
- 2** B sends a response indicating that the telephone is ringing.
- 3** B sends an OK response after the call is answered.
- 4** A then sends an ACK message to acknowledge that B has answered the call.
- 5** Now A and B exchange voice media (talk).
- 6** After talking, A hangs up and sends a BYE request.
- 7** B replies with an OK response confirming receipt of the BYE request and the call is terminated.

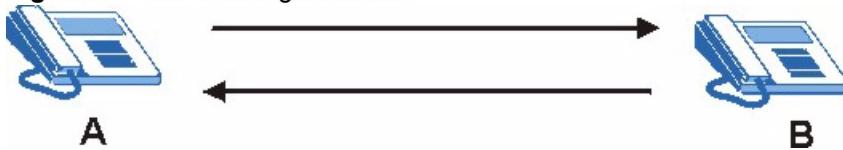
5.2.3 SIP Servers

SIP is a client-server protocol. A SIP client is an application program or device that sends SIP requests. A SIP server responds to the SIP requests.

When you use SIP to make a VoIP call, it originates at a client and terminates at a server. A SIP client could be a computer or a SIP phone. One device can act as both a SIP client and a SIP server.

5.2.3.1 SIP User Agent Server

A SIP user agent server can make and receive VoIP telephone calls. This means that SIP can be used for peer-to-peer communications even though it is a client-server protocol. In the following figure, either A or B can act as a SIP user agent client to initiate a call. A and B can also both act as a SIP user agent server to receive the call.

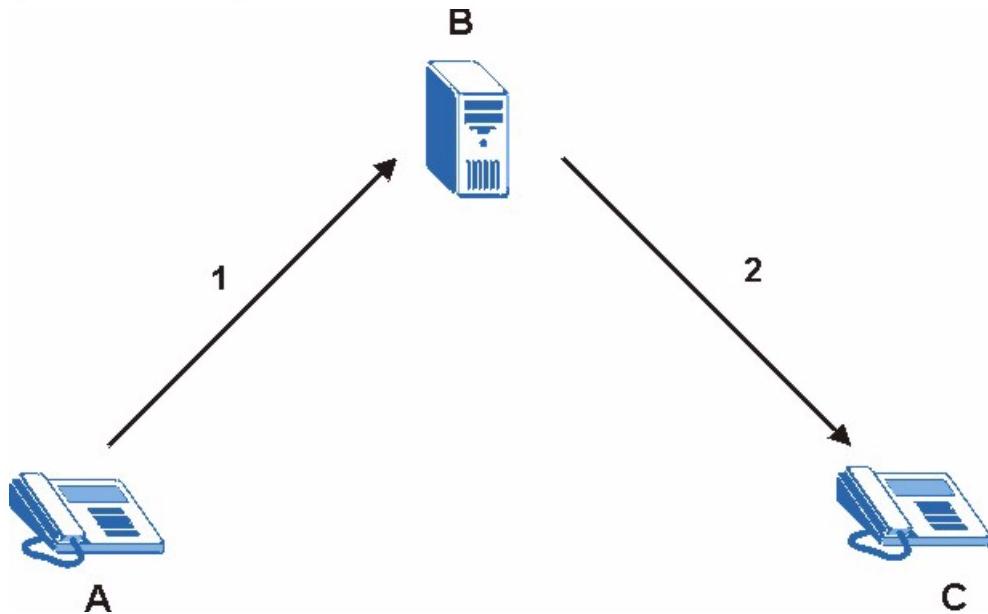
Figure 12 SIP User Agent Server

5.2.3.2 SIP Proxy Server

A SIP proxy server receives requests from clients and forwards them to another server.

In the following example, you want to use client device A to call someone who is using client device C.

- 1** The client device (A in the figure) sends a call invitation to the SIP proxy server (B).
- 2** The SIP proxy server forwards the call invitation to C.

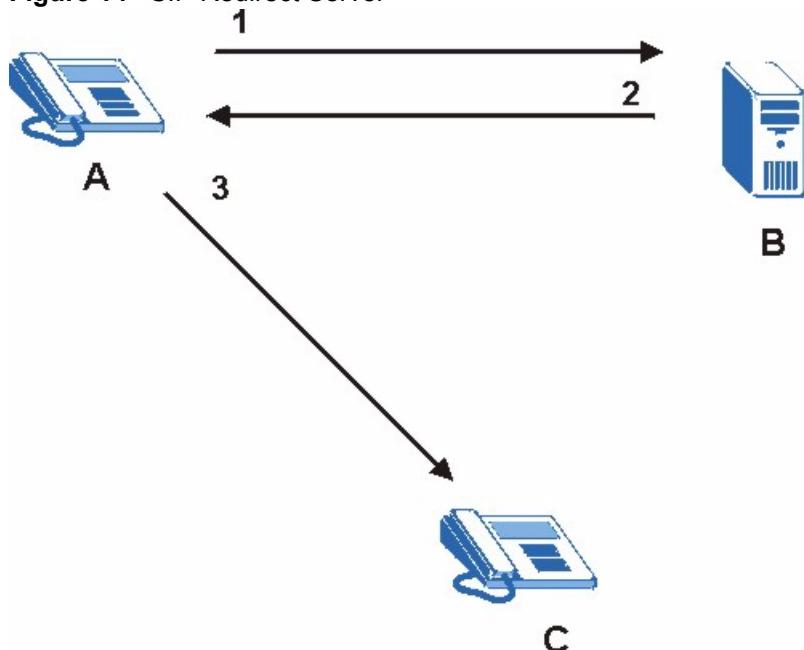
Figure 13 SIP Proxy Server

5.2.3.3 SIP Redirect Server

A SIP redirect server accepts SIP requests, translates the destination address to an IP address and sends the translated IP address back to the device that sent the request. Then the client device that originally sent the request can send requests to the IP address that it received back from the redirect server. Redirect servers do not initiate SIP requests.

In the following example, you want to use client device A to call someone who is using client device C.

- 1** Client device A sends a call invitation for C to the SIP redirect server (B).
- 2** The SIP redirect server sends the invitation back to A with C's IP address (or domain name).
- 3** Client device A then sends the call invitation to client device C.

Figure 14 SIP Redirect Server

5.2.3.4 SIP Register Server

A SIP register server maintains a database of SIP identity-to-IP address (or domain name) mapping. The register server checks your user name and password when you register.

5.2.4 RTP

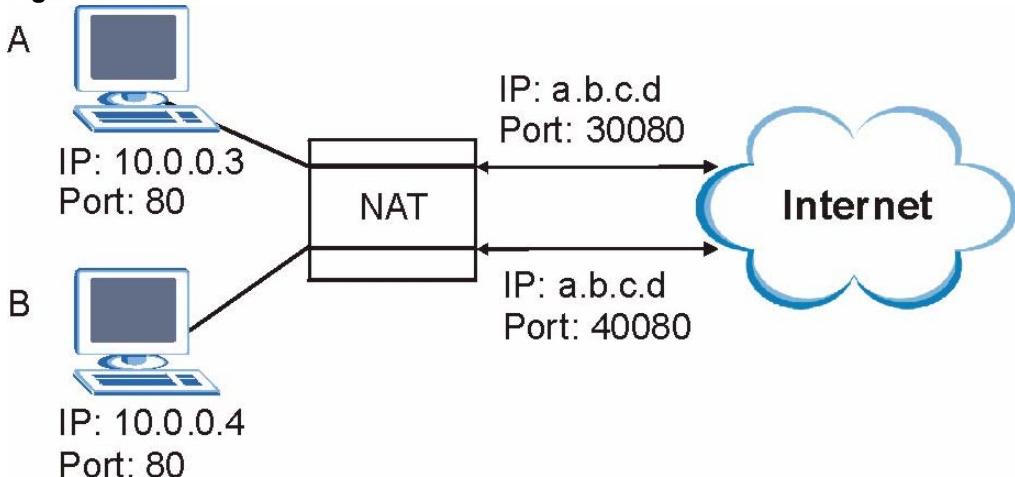
When you make a VoIP call using SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

5.3 STUN

STUN (Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators) allows the Prestige to find the presence and types of NAT routers and/or firewalls between it and the public Internet. STUN also allows the Prestige to find the public IP address that NAT assigned, so the Prestige can embed it in the SIP data stream. See RFC 3489 for details on STUN.

5.3.1 NAT

NAT routers are commonly used to translate private (or internal) IP addresses in packet headers to public (or external) IP addresses and vice versa. NAT A NAT router maps a private IP address and port pair to a public IP address and port, and whenever the NAT router receives a packet with that public IP address and port, it knows how to reroute the packet back to the private IP address and port. The figures in this section use lower-case letters (like a.b.c.d for example) to represent public IP addresses. In the following figure, NAT maps the same IP address to both A and B, but uses separate ports.

Figure 15 NAT

NAT does not translate IP addresses that are imbedded in the data stream. In order to make VoIP calls, the Prestige must register its public IP address with a SIP register server. The SIP register server gets the Prestige's IP address from inside the SIP data stream and maps it to your SIP identity. If there is a NAT router between the Prestige and the SIP register server, the Prestige probably has a private IP address and it will be embedded in the data stream.

5.3.2 NAT Types

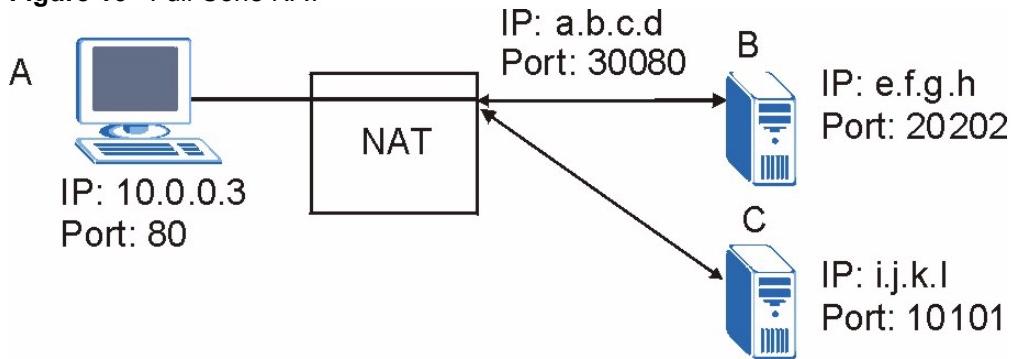
There are four types of NAT:

- Full Cone
- Restricted Cone
- Port Restricted Cone
- Symmetric

The first three NAT types use mapping for a private IP address that is independent of the destination address. Symmetric NAT allocates a new mapping for each different destination IP address. STUN does not work with symmetric NAT routers ([see “Symmetric NAT”](#)) or firewalls.

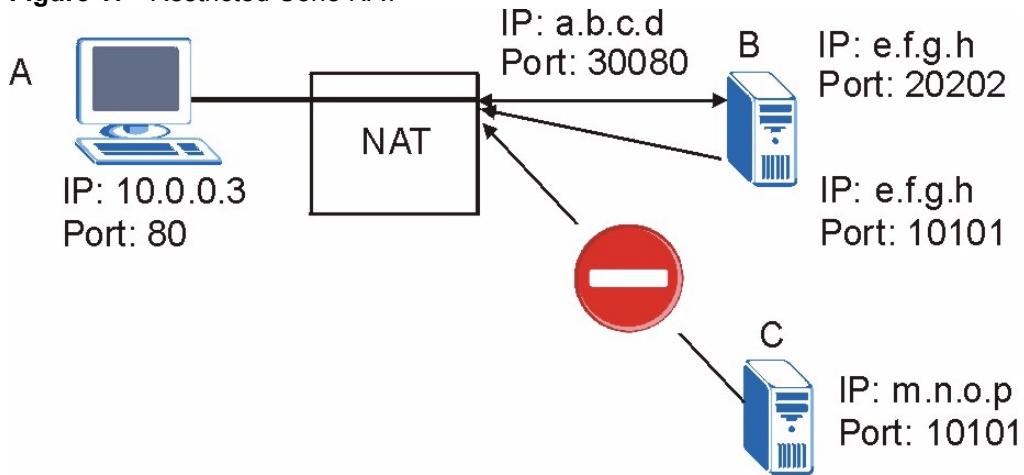
5.3.2.1 Full Cone NAT

In full cone NAT, all requests from the same private IP address and port are mapped to the same public IP address and port. Someone on the Internet only needs to know the mapping scheme in order to send packets to a device behind the NAT router. See the following figure. Computer A is behind a NAT router and has a private IP address of 10.0.0.3 and is sending and receiving packets on port 80. It is mapped to the public IP address a.b.c.d and port 30080. Anyone on the Internet (B and C in this example) can send packets to IP address a.b.c.d and port 30080 and the NAT router will send them to computer A (at IP address 10.0.0.3 port 80).

Figure 16 Full Cone NAT

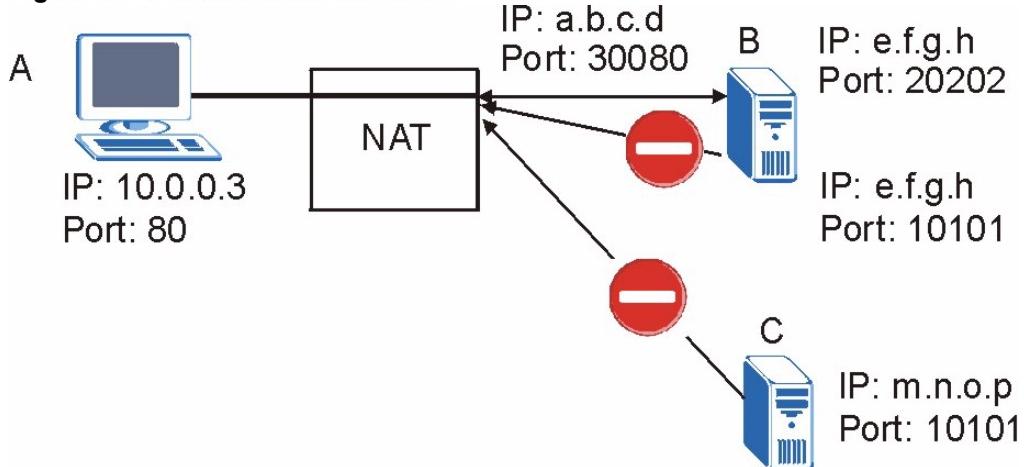
5.3.2.2 Restricted Cone NAT

Restricted cone NAT maps all requests from the same private IP address and port to the same public IP address and port. In contrast to full cone NAT, a host on the Internet can only send a packet to the private IP address and port if the private IP address and port has previously sent a packet to that host. In the following figure, if A has sent a packet to B, then B can send packets to A and B's source port can vary. C cannot send packets to A because A never sent a packet to C.

Figure 17 Restricted Cone NAT

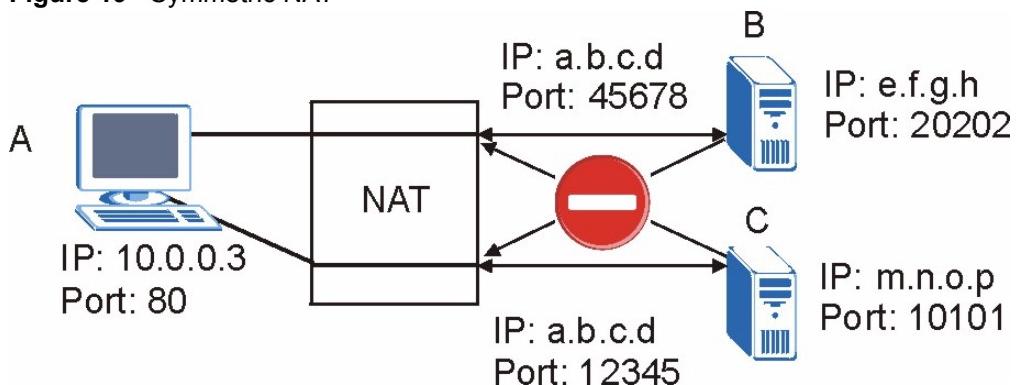
5.3.2.3 Port Restricted Cone NAT

Port restricted cone NAT is like a restricted cone NAT, but port numbers are included in the restriction. In the following figure, B can send packets, with source IP address e.f.g.h and port 20202 to A because A previously sent a packet to IP address e.f.g.h and port 20202. B cannot send packets, with source IP address e.f.g.h and port 10101 to A because A has not sent a packet to IP address e.f.g.h and port 10101.

Figure 18 Port Restricted Cone NAT

5.3.2.4 Symmetric NAT

Symmetric NAT is different from the cone NAT types in that a specific NAT mapping of a private IP address and port to a public IP address and port depends on the packet's destination IP address. In the following figure, if A sends a packet from IP address 10.0.0.3 and port 80 to B, it may be mapped as IP address a.b.c.d and port 45678, but if A sends from the same IP address and port to a different IP address, it is mapped differently (IP address a.b.c.d and port 12345).

Figure 19 Symmetric NAT

Computer B can only respond to its mapping (IP address a.b.c.d and port 45678) and computer C can only respond to its mapping (IP address a.b.c.d and port 12345). If either computer B or C tries to send to the other's mapped IP address and port, the NAT router will drop the packets. Like restricted cone NAT, a host on the Internet can only send a packet to the private IP address and port if the private IP address and port has previously sent a packet to that host.

5.4 SIP ALG

Some NAT routers may include a SIP Application Layer Gateway (ALG). A SIP ALG allows VoIP calls to pass through NAT by examining and translating IP addresses embedded in the data stream. When the Prestige registers with the SIP register server, the SIP ALG translates the Prestige's private IP address inside the SIP data stream to a public IP address. You do not need to use STUN if your Prestige is behind a SIP ALG.

5.5 Pulse Code Modulation

Pulse Code Modulation (PCM) measures analog signal amplitudes at regular time intervals and converts them into bits.

5.6 Voice Coding

A codec (coder/decoder) codes analog voice signals into digital signals and decodes the digital signals back into voice signals. The Prestige supports the following codecs.

5.6.1 G.711

G.711 is a Pulse Code Modulation (PCM) waveform codec. G.711 provides very good sound quality but requires 64kbps of bandwidth.

5.6.2 G.729

G.729 is an Analysis-by-Synthesis (AbS) hybrid waveform codec that uses a filter based on information about how the human vocal tract produces sounds. G.729 provides good sound quality and reduces the required bandwidth to 8kbps.

5.7 PSTN Call Setup Signaling

Dual-Tone MultiFrequency (DTMF) signaling uses pairs of frequencies (one lower frequency and one higher frequency) to set up calls. It is also known as Touch Tone®. Each of the keys on a DTMF telephone corresponds to a different pair of frequencies.

Pulse dialing sends a series of clicks to the local phone office in order to dial numbers.¹

1. The Prestige does not support pulse dialing at the time of writing.

CHAPTER 6

VoIP Screens

This chapter describes how to configure advanced VoIP and QoS settings.

6.1 VoIP Introduction

VoIP is the sending of voice signals over the Internet Protocol. This chapter covers the configuration of the **VoIP** screens.

6.2 VoIP Configuration

Click **VoIP** in the navigation panel to display the following screen. Use this screen to configure the Prestige's VoIP settings. You should have a voice account already set up and have VoIP information from your VoIP service provider.

Figure 20 VoIP

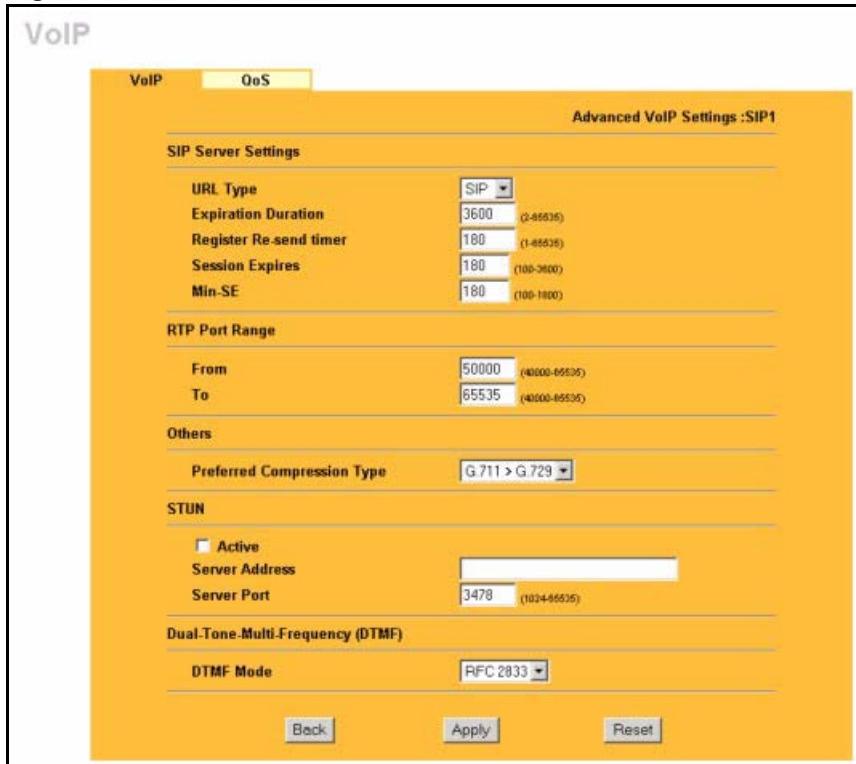
The screenshot shows the VoIP configuration interface. At the top, there are two tabs: "VoIP" (which is active) and "QoS". Below the tabs, the "SIP Account" is set to "SIP1". The "Active" checkbox is checked. The "SIP Settings" section contains fields for SIP Number (ChangeMe), SIP Local Port (5060), SIP Server Address (192.168.1.33), SIP Server Port (5060), REGISTER Server Address (192.168.1.33), REGISTER Server Port (5060), and SIP Service Domain (192.168.1.33). The "Authentication" section includes fields for Authentication User-ID (ChangeMe) and Authentication Password (XXXXXXXXXX). The "Caller ID" section has a checked checkbox for "Sending Caller ID". The "Incoming Call apply to" section allows selecting "Phone1" and "Phone2", with "Phone1" checked. The "Advanced Settings" section has a "Settings" button. At the bottom are "Apply" and "Reset" buttons.

Table 10 VoIP

LABEL	DESCRIPTION
SIP Account	You can configure the Prestige to use multiple SIP accounts. Select one to configure its settings on the Prestige.
Active	Select this check box to have the Prestige use this SIP account. Clear the check box to have the Prestige not use this SIP account.
SIP Number	Enter your SIP number in this field (use the number or text that comes before the @ symbol in a full SIP URI). You can use up to 127 ASCII characters.
SIP Local Port	Use this field to configure the Prestige's listening port for SIP. Leave this field set to the default if you were not given a local port number for SIP.
SIP Server Address	Type the IP address of the SIP server in this field. It doesn't matter whether the SIP server is a proxy, redirect or register server.
SIP Server Port	Enter the SIP server's listening port for SIP in this field. Leave this field set to the default if your VoIP service provider did not give you a server port number for SIP.
REGISTER Server Address	Enter the SIP register server's address in this field. If you were not given a register server address, then enter the address from the SIP Server Address field again here.
REGISTER Server Port	Enter the SIP register server's listening port for SIP in this field. If you were not given a register server port, then enter the port from the SIP Server Port field again here.
SIP Service Domain	Enter the SIP service domain name in this field (the domain name that comes after the @ symbol in a full SIP URI). You can use up to 127 ASCII Extended set characters.
Authentication User ID	This is the user name for registering this SIP account with the SIP register server. Type the user name exactly as it was given to you. You can use up to 95 ASCII characters.
Authentication Password	Type the password associated with the user name above. You can use up to 95 ASCII Extended set characters.
Block Caller ID	Select this check box to not show identification information when you make VoIP phone calls. Clear the check box to show identification information when you make VoIP phone calls.
Incoming Call apply to	Phone 1 and Phone 2 correspond to the Prestige's physical PHONE 1 and 2 ports, respectively. Select whether you want to receive calls for this SIP account on Phone 1 , Phone 2 or both. If you select both, you will not know which SIP account a call is coming in on.
Advanced Settings	Click Settings to open a screen where you can configure the Prestige's advanced VoIP settings like SIP server settings, the RTP port range and the coding type.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

6.3 Advanced VoIP Settings Configuration

Click **VoIP** in the navigation panel, select a SIP account and then click **Settings** to display the following screen.

Figure 21 VoIP Advanced

The following table describes the labels in this screen.

Table 11 VoIP Advanced

LABEL	DESCRIPTION
Advanced VoIP Settings	This read-only field displays the number of the SIP account that you are configuring. The changes that you save in this page affect the Prestige's settings with the SIP account displayed here.
SIP Server Settings	
URL Type	Select SIP to have the Prestige include the domain name with the SIP number in the SIP messages that it sends. Select TEL to have the Prestige use the SIP number without a domain name in the SIP messages that it sends.
Expiration Duration	This field sets how long an entry remains registered with the SIP register server. After this time period expires, the SIP register server deletes the Prestige's entry from the database of registered SIP numbers. The register server can use a different time period. The Prestige sends another registration request after half of this configured time period has expired.
Register Resend Timer	Use this field to set how long the Prestige waits before sending a repeat registration request if a registration attempt fails or there is no response from the registration server.
Session Expires	Use this field to set the longest time that the Prestige will allow a SIP session to remain idle (without traffic) before dropping it.

Table 11 VoIP Advanced (continued)

LABEL	DESCRIPTION
Min-SE	When two SIP devices negotiate a SIP session, they must negotiate a common expiration time for idle SIP sessions. This field sets the shortest expiration time that the Prestige will accept. The Prestige checks the session expiration values of incoming SIP INVITE requests against the minimum session expiration value that you configure here. If the session expiration of an incoming INVITE request is less than the value you configure here, the Prestige negotiates with the other SIP device to increase the session expiration value to match the Prestige's minimum session expiration value.
RTP Port Range	Real time Transport Protocol is used to handle voice data transfer. Use this field to configure the Prestige's listening port range for RTP traffic. Leave these fields set to the defaults if you were not given a range of RTP ports to use.
Preferred Compression Type	<p>Use this field to select the type of voice coder/decoder (codec) that you want the Prestige to use. G.711 provides higher voice quality than G.729 but requires 64kbps of bandwidth while G.729 only requires 8kbps.</p> <p>Select G.711>G.729 if you want the Prestige to first attempt to use the G.711 codec and then the G.729 codec if the peer is not set up to use G.711.</p> <p>Select G.711 only if you want the Prestige to only use the G.711 codec when making VoIP calls. You will not be able to connect to a peer that is not set up to use G.711.</p> <p>Select G.729>G.711 if you want the Prestige to first attempt to use the G.729 codec and then the G.711 codec if the peer is not set up to use G.729.</p> <p>Select G.729 only if you want the Prestige to only use the G.729 codec when making VoIP calls. You will not be able to connect to a peer that is not set up to use G.729.</p>
STUN	
Active	<p>Select this check box to turn on STUN. Use STUN if there is a NAT router between the Prestige and the VoIP service provider's SIP server.</p> <p>You do not need to use STUN if the NAT router is also a SIP ALG.</p>
Server Address	Your VoIP service provider must host a STUN server in order for you to use STUN. Type the IP address of the STUN server in this field.
Server Port	Enter the STUN server's listening port for STUN requests in this field. Leave this field set to the default if your VoIP service provider did not give you a server port number for STUN.
DTMF Mode	<p>The Dual Tone Multi-Frequency (DTMF) mode sets how the Prestige handles the tones that your telephone makes when you push its buttons. It is recommended that you use the same mode that your VoIP service provider uses.</p> <p>Select RFC 2833 to send the DTMF tones in RTP packets.</p> <p>Select PCM (Pulse Code Modulation) to include the DTMF tones in the voice data stream. This method works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729) could distort the tones.</p> <p>Select SIP INFO to send the DTMF tones in SIP messages.</p>
Back	Click Back to return to the VoIP screen without saving configuration changes.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

6.4 Quality of Service (QoS)

Quality of Service (QoS) refers to both a network's ability to deliver data with minimum delay, and the networking methods used to provide bandwidth for real-time multimedia applications.

6.4.1 Type Of Service (ToS)

Network traffic can be classified by setting the ToS (Type Of Service) values at the data source (for example, at the Prestige) so a server can decide the best method of delivery, that is the least cost, fastest route and so on.

6.4.2 DiffServ

DiffServ is a class of service (CoS) model that marks packets so that they receive specific per-hop treatment at DiffServ-compliant network devices along the route based on the application types and traffic flow. Packets are marked with DiffServ Code Points (DSCPs) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.¹

6.4.2.1 DSCP and Per-Hop Behavior

DiffServ defines a new DS (Differentiated Services) field to replace the Type of Service (TOS) field in the IP header. The DS field contains a 2-bit unused field and a 6-bit DSCP field which can define up to 64 service levels. The following figure illustrates the DS field.

DSCP is backward compatible with the three precedence bits in the ToS octet so that non-DiffServ compliant, ToS-enabled network device will not conflict with the DSCP mapping.

Figure 22 DiffServ: Differentiated Service Field

DSCP (6-bit)	Unused (2-bit)
-----------------	-------------------

The DSCP value determines the forwarding behavior, the PHB (Per-Hop Behavior), that each packet gets across the DiffServ network. Based on the marking rule, different kinds of traffic can be marked for different priorities of forwarding. Resources can then be allocated according to the DSCP values and the configured policies.

6.4.3 VLAN

Virtual Local Area Network (VLAN) allows a physical network to be partitioned into multiple logical networks. Only stations within the same group can communicate with each other.

1. The Prestige does not support DiffServ at the time of writing.

Your Prestige can add IEEE 802.1Q VLAN ID tags to voice frames that it sends to the network. This allows the Prestige to communicate with a SIP server that is a member of the same VLAN group. Some ISPs use the VLAN tag to identify voice traffic and give it priority over other traffic.

6.5 QoS Configuration

Click **VoIP** in the navigation panel and then **QoS** to display the following screen.

Figure 23 QoS

The screenshot shows the QoS configuration interface. At the top, there are two tabs: "VoIP" (which is selected) and "QoS". Below the tabs, there are two main sections: "TOS" and "VLAN". In the "TOS" section, there are two input fields: "SIP TOS Priority Setting" (set to 5) and "RTP TOS Priority Setting" (set to 5). In the "VLAN" section, there is a checkbox labeled "Enable VLAN Tag" which is checked, and an input field for "Voice VLAN ID" set to 0. At the bottom of the screen are two buttons: "Apply" and "Reset".

The following table describes the labels in this screen.

Table 12 QoS

LABEL	DESCRIPTION
SIP TOS Priority	Type a priority for voice transmissions. The Prestige applies Type of Service priority tags with this priority to voice traffic that it transmits. Priorities 6 and 7 are reserved for network control traffic. It is recommended that you use priority 5 for SIP.
RTP TOS Priority	Type a priority for voice transmissions. The Prestige applies Type of Service priority tags with this priority to RTP traffic that it transmits. Priorities 6 and 7 are reserved for network control traffic. It is recommended that you use priority 5 for RTP.
Enable VLAN Tag	Enable VLAN tagging if the Prestige needs to be a member of a VLAN group in order to communicate with the SIP server. Your LAN and gateway must also be set up to use VLAN tags. Some switches also give priority to voice traffic based on its VLAN tag. Disable VLAN tagging if the Prestige does not need to be a member of a VLAN group to communicate with the SIP server.
Voice VLAN ID	Type the VLAN ID (VID) from 0 to 4095 for the Prestige to add to voice Ethernet frames that it sends out to the network.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

CHAPTER 7

Phone

This chapter covers how to adjust the Prestige's phone settings.

7.1 Phone Introduction

You can configure the volume, echo cancellation and VAD settings for each individual phone port on the Prestige. You can also select which SIP account to use for making outgoing calls.

7.1.1 Voice Activity Detection/Silence Suppression

Voice Activity Detection (VAD) detects whether or not speech is present. This lets the Prestige reduce the bandwidth that a call uses by not transmitting "silent packets" when you are not speaking.

7.1.2 Comfort Noise Generation

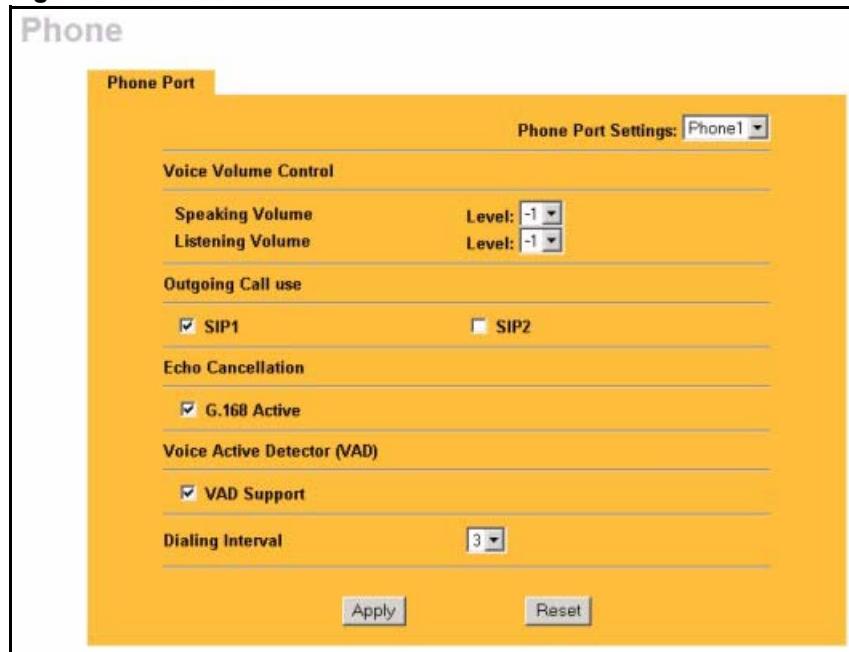
When using VAD, the Prestige generates and sends comfort noise when you are not speaking. Comfort noise uses the lowest possible transmission bandwidth to match the background noise. The comfort noise lets the person at the other end of the connection know that the line is still connected (total silence would easily be mistaken for a lost connection).

7.1.3 Echo Cancellation

G.168 is an ITU-T standard for eliminating the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.

7.2 Phone Port Configuration

Click **PHONE** in the navigation panel to display the following screen.

Figure 24 Phone Port

The following table describes the labels in this screen.

Table 13 Phone Port

LABEL	DESCRIPTION
Phone Port Settings	Use this field to select the phone port that you want to configure.
Speaking Volume	Use this field to set the loudness that the Prestige uses for the speech signal that it sends to the peer device. -1 is the quietest and 1 is the loudest.
Listening Volume	Use this field to set the loudness that the Prestige uses for the speech signal that it receives from the peer device and sends to your phone. -1 is the quietest and 1 is the loudest.
Outgoing Call use	SIP 1 and SIP 2 correspond to the Prestige's SIP accounts. Select whether you want the phone(s) attached to this phone port to use SIP account 1, 2 or both when you make a call. If you select both SIP accounts, the Prestige will first try to use SIP account 2 and then SIP account 1 when you make a call.
G.168 Active	Select this check box to cancel the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.
VAD Support	Select this check box to use Voice Activity Detection (VAD) to reduce the bandwidth that a call uses. The Prestige will generate and send comfort noise when you are not talking.
Dialing Interval	When you are dialing a telephone number the Prestige waits this long after you stop pressing the buttons before initiating the call. Select how many seconds you want the Prestige to wait after the last input on the telephone's keypad before dialing (making) a call.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

CHAPTER 8

Phone Book

This chapter covers how to configure the Prestige's phone book.

8.1 Phone Book Introduction

You can use the phone book feature to configure speed dial entries and the lifeline settings.

8.1.1 Speed Dial

Speed dial provides shortcuts for dialing frequently used (VoIP) phone numbers.

8.1.1.1 Peer-to-Peer Calls

You can call another VoIP device directly without going through a SIP server. You must set up a speed dial entry in the phone book in order to do this. Select **Non-Proxy (Use IP or URL)** in the **Type** column and enter the callee's IP address or domain name. The Prestige sends SIP INVITE requests to the peer VoIP device when you use the speed dial entry.

You do not need to configure a SIP account on the Prestige 2002 in order to make a peer-to-peer VoIP call. You must still configure a SIP account on the Prestige 2002L in order to make a peer-to-peer VoIP call.

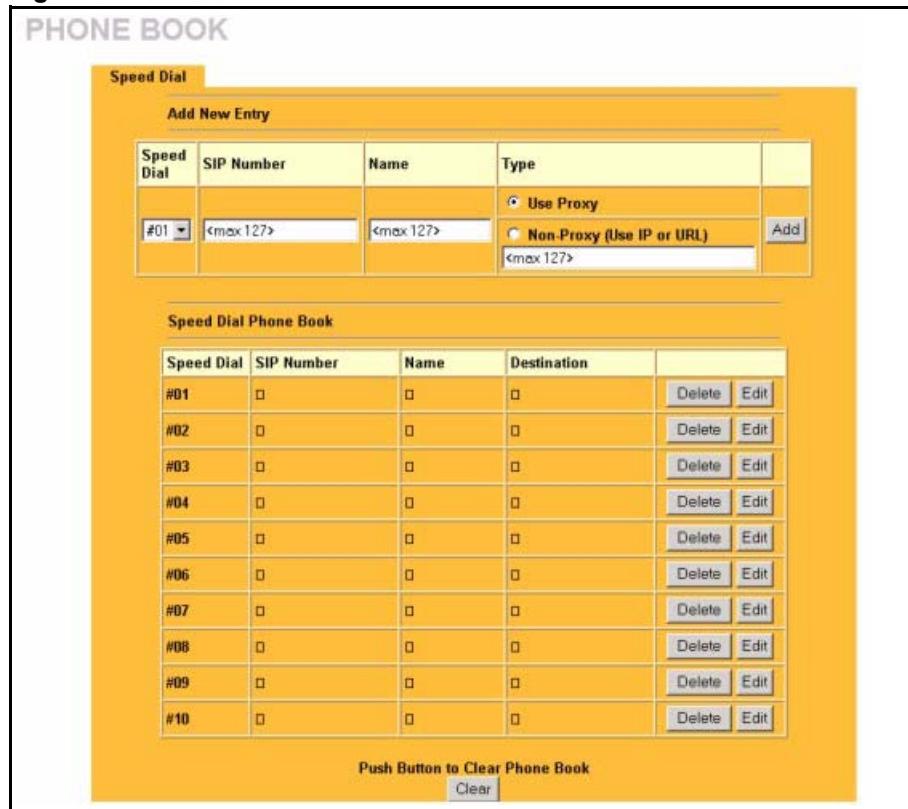
8.1.2 Lifeline (Prestige 2002L)

With lifeline you can make and receive regular phone calls. Use a prefix number to make a regular call whenever the VoIP service is available. When the VoIP service is not available, you can make regular calls without dialing a prefix number. You can also specify phone numbers to which the Prestige will always send calls through the regular phone service (without the need of dialing a prefix number).

You can also specify phone numbers that should always use the regular phone service (without having to dial a prefix number). Do this for emergency numbers (like those for contacting police, fire or emergency medical services).

8.2 Speed Dial Configuration

Click **PHONEBOOK** in the navigation panel and then **Speed Dial** to display the following screen.

Figure 25 Phone Book

The following table describes the labels in this screen.

Table 14 Phone Book

LABEL	DESCRIPTION
Add New Entry	Use this section of the screen to edit and save new or existing speed dial phone book entries.
Speed Dial	Select a speed dial key combination from the drop-down list box.
SIP Number	Enter the SIP number of the party that you will call (use the number or text that comes before the @ symbol in a full SIP URI). You can use up to 127 ASCII characters.
Name	Enter a descriptive name to identify the party that you will use this entry to call. You can use up to 127 ASCII characters.
Type	Select Use Proxy if calls to this party use your SIP account configured in the VoIP screen. Select Non-Proxy (Use IP or URL) if calls to this party use a different SIP server or go directly to the callee's VoIP phone (peer-to-peer). Enter the SIP server's or the party's IP address or domain name (up to 127 ASCII Extended set characters).
Add	Click this button to save the entry in the speed dial phone book. The speed dial entry displays in the Speed Dial Phone Book section of the screen.
Speed Dial Phone Book	This section of the screen displays the currently saved speed dial entries. You can configure up to 10 entries and use them to make calls.
Speed Dial	This is the entry's speed dial key combination. Press this key combination on a telephone attached to the Prestige in order to call the party named in this entry.
Name	This is the descriptive name of the party that you will use this speed dial entry to call.

Table 14 Phone Book (continued)

LABEL	DESCRIPTION
SIP Number	This is the SIP number of the party that you will call.
Type	This field displays Use Proxy if calls to this party use one of your SIP accounts. This field displays the SIP server's or the party's IP address or domain name if calls to this party do not use one of your SIP accounts.
Delete	Click this button to remove an entry from the speed dial phone book.
Edit	Click this button to change the speed dial entry. The speed dial entry displays in the Add New Entry section of the screen where you can edit it.
Clear	Click this button to remove all of the entries from the speed dial phone book.

8.3 Lifeline Configuration (Prestige 2002L)

Click **PHONEBOOK** in the navigation panel and then **Lifeline** to display the following screen.

Figure 26 Lifeline

The following table describes the labels in this screen.

Table 15 Lifeline

LABEL	DESCRIPTION
PSTN Pre-fix Number	Specify the prefix number for dialing regular calls when the VoIP service is available.
Relay to PSTN	Use these fields to specify phone numbers to which the Prestige will always send calls through the regular phone service without the need of dialing a prefix number. These numbers must be for phones on the PSTN (not VoIP phones).
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

CHAPTER 9

Logs

This chapter contains information about the Prestige's Logs screen. Refer to the Appendices for example log message explanations.

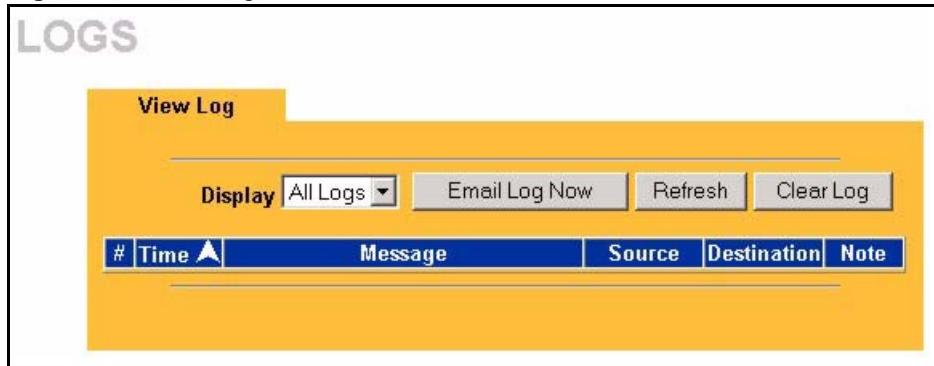
9.1 Viewing Logs

The web configurator allows you to look at all of the Prestige's logs in one location.

Click **LOGS** in the navigation panel to open the **View Log** screen. Use the **View Log** screen to display the Prestige's logs.

Log entries in red indicate system error logs. The log wraps around and deletes the old entries after it fills. Click a column heading to sort the entries. A triangle indicates ascending or descending sort order.

Figure 27 View Log



The following table describes the labels in this screen.

Table 16 View Log

LABEL	DESCRIPTION
Display	Select All Logs to view all of the Prestige's logs. Select System Maintenance to view the Prestige's maintenance logs. Select System Error to view the Prestige's error logs. Select SIP to view Session Initiation Protocol logs. Select RTP to view Real time Transport Protocol logs. Select FSM to view Finite State Machine logs. These logs record phone actions.
Refresh	Click Refresh to renew the log screen.
Clear Log	Click Clear Log to delete all the logs.
Time	This field displays the time the log was recorded. To configure the Prestige's time and date, see Chapter 3 System Screens .
Message	This field states the reason for the log.
Source	This field lists the source IP address and the port number of the incoming packet.

Table 16 View Log (continued)

LABEL	DESCRIPTION
Destination	This field lists the destination IP address and the port number of the incoming packet.
Note	This field displays additional information about the log entry.

9.1.1 Log Message Descriptions

The following tables provide descriptions of example log messages.

Table 17 System Error Logs

LOG MESSAGE	DESCRIPTION
WAN connection is down.	A WAN connection is down. You cannot access the network through this interface.

Table 18 System Maintenance Logs

LOG MESSAGE	DESCRIPTION
Time calibration is successful	The device has adjusted its time based on information from the time server.
Time calibration failed	The device failed to get information from the time server.
WAN interface gets IP: %s	A WAN interface got a new IP address from the DHCP, PPPoE, PPTP or dial-up server.
DHCP client IP expired	A DHCP client's IP address has expired.
Successful WEB login	Someone has logged on to the device's web configurator interface.
WEB login failed	Someone has failed to log on to the device's web configurator interface.
Successful FTP login	Someone has logged on to the device via ftp.
FTP login failed	Someone has failed to log on to the device via ftp.
Time initialized by Daytime Server	The device got the time and date from the Daytime server.
Time initialized by Time server	The device got the time and date from the time server.
Time initialized by NTP server	The device got the time and date from the NTP server.
Connect to Daytime server fail	The device was not able to connect to the Daytime server.
Connect to Time server fail	The device was not able to connect to the Time server.
Connect to NTP server fail	The device was not able to connect to the NTP server.

Table 18 System Maintenance Logs (continued)

LOG MESSAGE	DESCRIPTION
Too large ICMP packet has been dropped	The device dropped an ICMP packet that was too large.
Configuration Change: PC = 0x%x, Task ID = 0x%x	The device is saving configuration changes.

Table 19 SIP Logs

LOG MESSAGE	DESCRIPTION
SIP Registration Success by SIP:SIP Phone Number	The listed SIP account was successfully registered with a SIP register server.
SIP Registration Fail by SIP:SIP Phone Number	An attempt to register the listed SIP account with a SIP register server was not successful.
SIP UnRegistration Success by SIP:SIP Phone Number	The listed SIP account's registration was deleted from the SIP register server.
SIP UnRegistration Fail by SIP:SIP Phone Number	An attempt to delete the listed SIP account's registration from the SIP register server failed.

Table 20 RTP Logs

LOG MESSAGE	DESCRIPTION
Error, RTP init fail	The initialization of an RTP session failed.
Error, Call fail: RTP connect fail	A VoIP phone call failed because the RTP session could not be established.
Error, RTP connection cannot close	The termination of an RTP session failed.

Table 21 FSM Logs: Caller Side

LOG MESSAGE	DESCRIPTION
VoIP Call Start Ph[Phone Port Number] <- Outgoing Call Number	Someone used a phone connected to the listed phone port to initiate a VoIP call to the listed destination.
VoIP Call Established Ph[Phone Port] -> Outgoing Call Number	Someone used a phone connected to the listed phone port to make a VoIP call to the listed destination.
VoIP Call End Phone[Phone Port]	A VoIP phone call made from a phone connected to the listed phone port has terminated.

Table 22 FSM Logs: Callee Side

LOG MESSAGE	DESCRIPTION
VoIP Call Start from SIP[SIP Port Number]	A VoIP phone call came to the Prestige from the listed SIP number.
VoIP Call Established Ph[Phone Port] <- Outgoing Call Number	A VoIP phone call was set up from the listed SIP number to the Prestige.
VoIP Call End Phone[Phone Port]	A VoIP phone call that came into the Prestige has terminated.

Table 23 Lifeline Logs

LOG MESSAGE	DESCRIPTION
PSTN Call Start	A PSTN call has been initiated.
PSTN Call End	A PSTN call has terminated.
PSTN Call Established	A PSTN call has been set up.

CHAPTER 10

Maintenance

This chapter displays system information such as ZyNOS firmware, port IP addresses and port traffic statistics.

10.1 Maintenance Overview

The maintenance screens can help you view system information, upload new firmware, manage configuration and restart your Prestige.

10.2 Status Screen

Click **MAINTENANCE** in the navigation panel to open the **Status** screen, where you can use to monitor your Prestige. Note that these fields are READ-ONLY and are meant to be used for diagnostic purposes.

Figure 28 System Status

The screenshot shows the 'SYSTEM STATUS' page with the following details:

- Header:** Status, F/W Upload, Configuration, Restart (with F/W Upload highlighted)
- System Name:** P2002
- Model Name:** Prestige 2002
- ZyNOS Firmware Version:** V3.60(MD.0)b1 | 05/04/2004
- Routing Protocols:** IP
- Ethernet Port:**
 - IP Address: 0.0.0.0
 - IP Subnet Mask: 0.0.0.0
- Mgmt Port:**
 - IP Address: 192.168.5.1
 - IP Subnet Mask: 0.0.0.0
- VoIP status:**
 - SIP1**: SIP Registration Status: Register fail, Used Port: 5060/UDP, Register button
 - SIP2**: SIP Registration Status: Register fail, Used Port: 5060/UDP, Register button

The following table describes the labels in this screen.

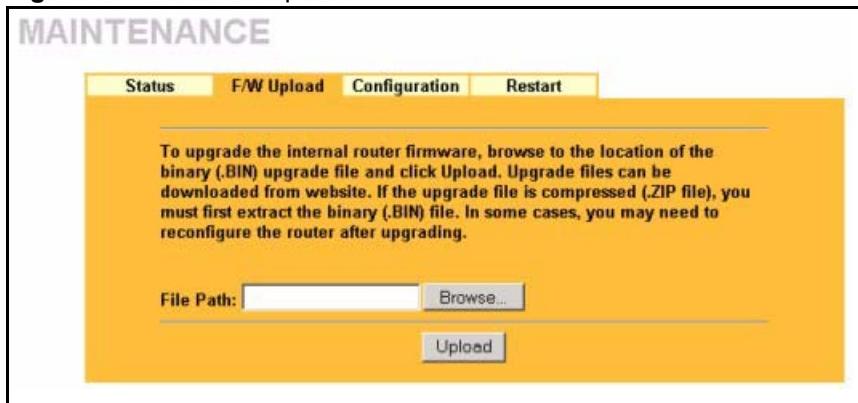
Table 24 System Status

LABEL	DESCRIPTION
System Name	This is the System Name you chose in the SYSTEM General screen. It is for identification purposes
Model Name	The model name identifies your device type. The model name should also be on a sticker on your device. If you are uploading firmware, be sure to upload firmware for this exact model name.
ZyNOS Firmware Version:	This is the ZyNOS Firmware version and the date created. ZyNOS is ZyXEL's proprietary Network Operating System design.
Ethernet Port	
IP Address	This is the Prestige's IP address. This applies to both of the Prestige's Ethernet ports.
IP Subnet Mask	This is the Prestige's subnet mask. This applies to both of the Prestige's Ethernet ports.
MGNT Port	
IP Address	This is the static IP address of the Prestige's logical Ethernet interface for management.
IP Subnet Mask	This is the subnet mask of the Prestige's logical Ethernet interface for management.
VoIP Status	
SIP1/SIP 2	This is the SIP account configured on the Prestige
SIP Registration Status	This is the SIP registration status of the SIP account. This field displays Registered when the Prestige has successfully registered the SIP account with the SIP register server. This field displays Not Registered when the Prestige has not successfully registered the SIP account with the SIP register server.
Register/Unregister	Click Register to have the Prestige attempt to register the SIP account with the SIP register server. Click Unregister to delete the SIP account's registration on the SIP register server. This removes the SIP registration server's SIP identity-to-IP address (or domain name) mapping for this SIP account, it does not cancel your SIP account.
Used Port	This field displays the Prestige's listening port for SIP traffic on this SIP account.

10.3 F/W Upload Screen

Find firmware at www.zyxel.com in a file that (usually) uses the system model name with a ".bin" extension, e.g., "Prestige.bin". The upload process uses HTTP (Hypertext Transfer Protocol) and may take up to two minutes. After a successful upload, the system will reboot.

Click **MAINTENANCE** in the navigation panel and then the **F/W UPLOAD** tab. Follow the instructions in this screen to upload firmware to your Prestige.

Figure 29 Firmware Upload

The following table describes the labels in this screen.

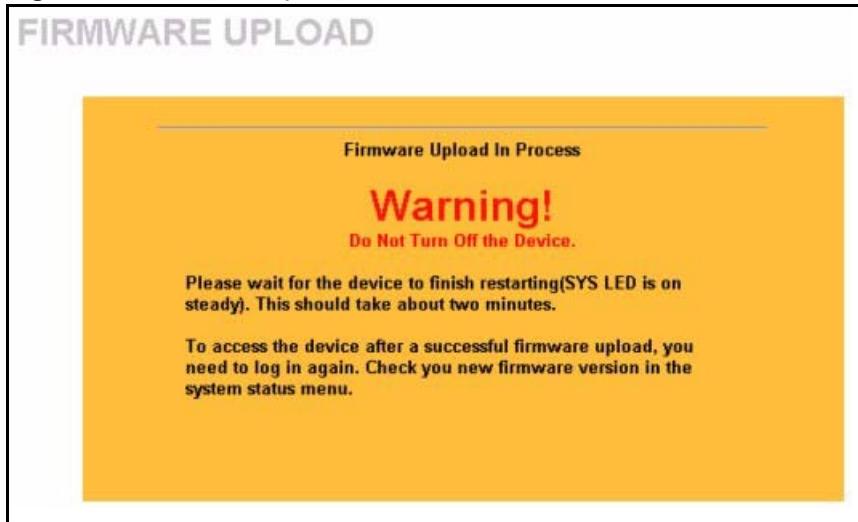
Table 25 Firmware Upload

LABEL	DESCRIPTION
File Path	Type in the location of the file you want to upload in this field or click Browse... to find it.
Browse...	Click Browse... to find the .bin file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Upload	Click Upload to begin the upload process. This process may take up to two minutes.



Note: Do not turn off the device while firmware upload is in progress!

After you see the **Firmware Upload in Process** screen, wait two minutes before logging into the device again.

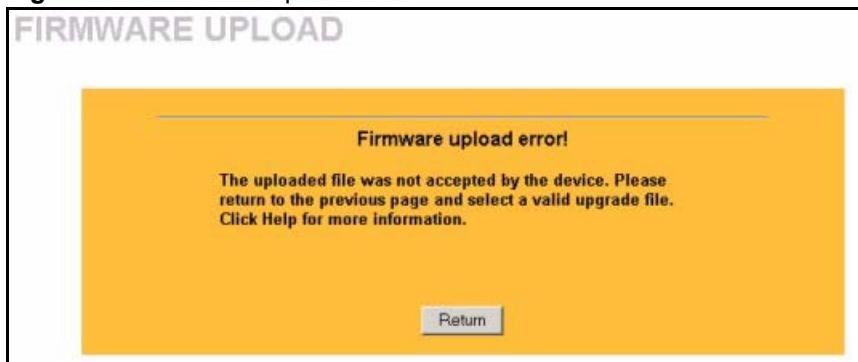
Figure 30 Firmware Upload In Process

The device automatically restarts in this time causing a temporary network disconnect. In some operating systems, you may see the following icon on your desktop.

Figure 31 Network Temporarily Disconnected

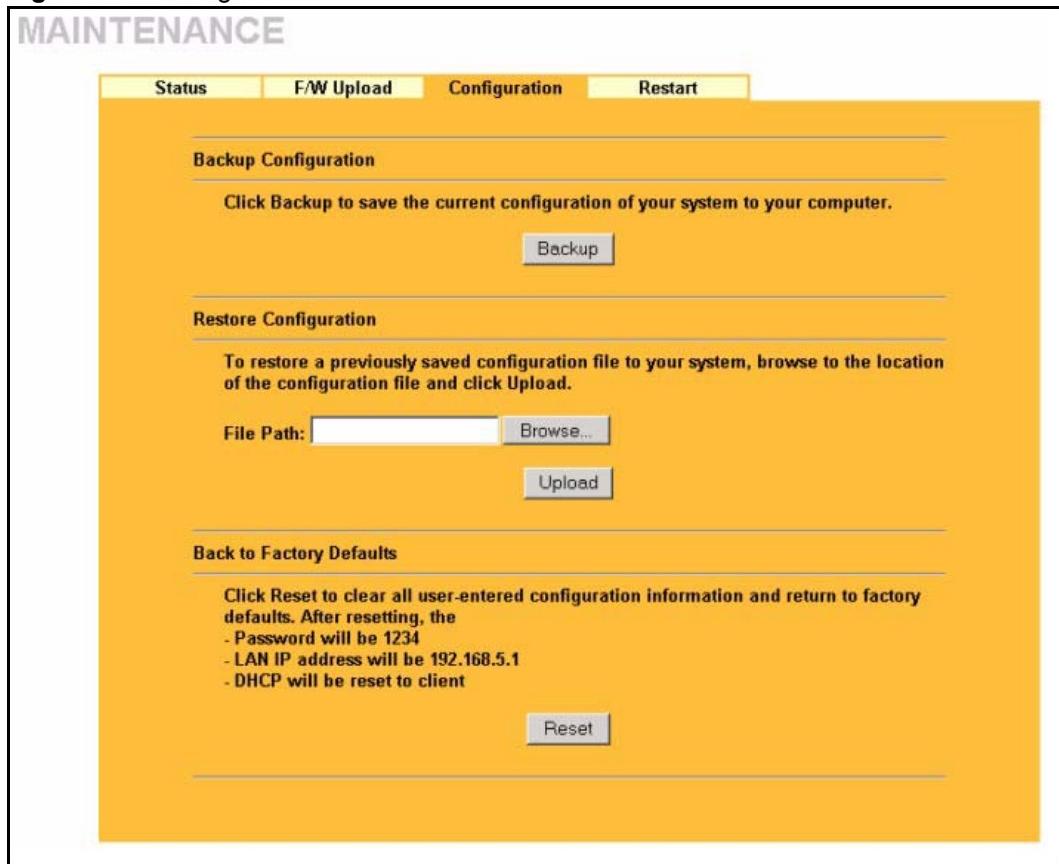
After two minutes, log in again and check your new firmware version in the **System Status** screen.

If the upload was not successful, the following screen will appear. Click **Return** to go back to the **F/W Upload** screen.

Figure 32 Firmware Upload Error

10.4 Configuration Screen

Click **MAINTENANCE** in the navigation panel and then the **Configuration** tab. Information related to factory defaults, backup configuration, and restoring configuration appears as shown next.

Figure 33 Configuration

10.4.1 Backup Configuration

Backup Configuration allows you to back up (save) the device's current configuration to a file on your computer. Once your device is configured and functioning properly, it is highly recommended that you back up your configuration file before making configuration changes. The backup configuration file will be useful in case you need to return to your previous settings.

Click **Backup** to save the device's current configuration to your computer.

10.4.2 Restore Configuration

Restore Configuration allows you to upload a new or previously saved configuration file from your computer to your Prestige.

Table 26 Restore Configuration

LABEL	DESCRIPTION
File Path	Type in the location of the file you want to upload in this field or click Browse... to find it.
Browse...	Click Browse... to find the file you want to upload. Remember that you must decompress compressed (.ZIP) files before you can upload them.
Upload	Click Upload to begin the upload process.



Note: Do not turn off the device while configuration file upload is in progress.

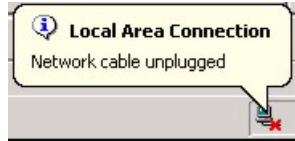
After you see a “configuration upload successful” screen, you must then wait one minute before logging into the device again.

Figure 34 Configuration Upload Successful



The device automatically restarts in this time causing a temporary network disconnect. In some operating systems, you may see the following icon on your desktop.

Figure 35 Network Temporarily Disconnected

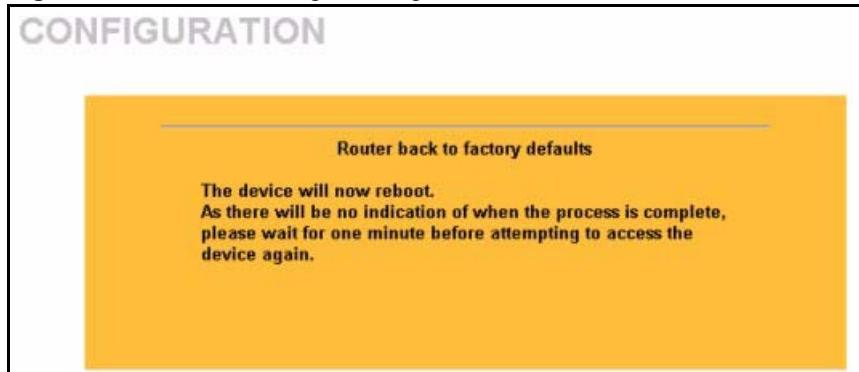


If you uploaded the default configuration file you may need to change the IP address of your computer to be in the same subnet as that of the default management IP address (192.168.5.1). See your *Quick Start Guide* or the appendices for details on how to set up your computer’s IP address.

If the upload was not successful, a **Configuration Upload Error** screen will appear. Click **Return** to go back to the **Configuration** screen.

10.4.3 Back to Factory Defaults

Clicking the **Reset** button in this section clears all user-entered configuration information and returns the Prestige to its factory defaults as shown on the screen. The following warning screen will appear.

Figure 36 Reset Warning Message

You can also press the **RESET** button on the rear panel to reset the factory defaults of your Prestige. For more information on the **RESET** button, [see the Resetting the Prestige section](#).

10.5 Restart Screen

System restart allows you to reboot the Prestige without turning the power off.

Click **MAINTENANCE** in the navigation panel and then **Restart**. Click **Restart** to have the Prestige reboot. This does not affect the Prestige's configuration.

Figure 37 Restart Screen

CHAPTER 11

Troubleshooting

This chapter covers potential problems and the corresponding remedies.

11.1 Problems Starting Up the Prestige

Table 27 Troubleshooting the Start-Up of Your Prestige

PROBLEM	CORRECTIVE ACTION
None of the LEDs turn on when I turn on the Prestige.	Make sure that the Prestige's power adaptor is connected to the Prestige and an appropriate power source. Check that the power source is turned on. Disconnect the Prestige's power and reconnect it. If the error persists, you may have a hardware problem. In this case, you should contact your vendor.

11.2 Problems with the LAN or PC LED

Table 28 Troubleshooting the LAN or PC LED

PROBLEM	CORRECTIVE ACTION
The LAN or PC LED does not turn on.	Check your Ethernet cable connections and type (refer to the <i>Quick Start Guide</i> for details). Check for faulty Ethernet cables. Make sure your computer's Ethernet card is working properly.

11.3 Problems with the LAN Interface

Table 29 Troubleshooting the LAN Interface

PROBLEM	CORRECTIVE ACTION
I cannot access the Prestige from the LAN.	If the LAN or PC LED is off, see Table 28 . Make sure that the IP address and the subnet mask of the Prestige and your computer(s) are on the same subnet.
I cannot ping any computer on the LAN.	If the LAN and PC LEDs are both off, see Table 28 . Make sure that the IP address and the subnet mask of the Prestige and the computers are on the same subnet.
The Prestige cannot get an IP address from the ISP.	The ISP provides the IP address after authenticating you. Authentication may be through the user name and password, the MAC address or the host name. The username and password apply to PPPoE and PPPoA encapsulation only. Make sure that you have entered the correct Service Type , User Name and Password (be sure to use the correct casing). Verify your Ethernet settings, see Chapter 4 Ethernet Screens .

11.4 Problems with Internet Access

Table 30 Troubleshooting Internet Access

PROBLEM	CORRECTIVE ACTION
I cannot access the Internet.	Make sure the Prestige is turned on and connected to the network. Verify your Ethernet settings, see Chapter 4 Ethernet Screens . Make sure you entered the correct user name and password.
Internet connection disconnects.	Contact your ISP.

11.5 Problems with the Password

Table 31 Troubleshooting the Password

PROBLEM	CORRECTIVE ACTION
I cannot access the Prestige.	The username is admin. The default password is 1234. The Password and Username fields are case-sensitive. Make sure that you enter the correct password and username using the proper casing. If you have changed the password and have now forgotten it, you will need to restore the default configuration file (see "Resetting the Prestige"). This restores all of the factory defaults including the password.

11.6 Problems with the Web Configurator

Table 32 Troubleshooting the Web Configurator

PROBLEM	CORRECTIVE ACTION
I cannot access the web configurator.	<p>Also see Table 31.</p> <p>Your computer's and the Prestige's IP addresses must be on the same subnet. Your computer's IP address must be on the same subnet as the Prestige's Ethernet IP address or management IP address (whichever you want to use to access the Prestige).</p> <p>If the Prestige's Ethernet IP address or management IP address has changed, then enter the new one as the URL.</p> <p>If you have switched from managing one Prestige 2002 to another, your computer's ARP (Address Resolution Protocol) table may contain an entry that maps the management IP address to a different Prestige 2002's MAC address).</p> <p>In Windows, use <code>arp -d</code> at the command prompt to delete all entries in your computer's ARP table. Otherwise, you can use <code>arp -d inet_addr [if_addr]</code> (where <code>if_addr</code> is the Prestige 2002's management IP address) to remove just the entry for the Prestige 2002's management IP address.</p>
I access the wrong Prestige 2002 when using the management IP address to access the Prestige 2002.	This problem may occur if you have more than one Prestige 2002 on the same LAN. Disconnect your Prestige 2002 from the network and connect directly through the Prestige 2002's PC port. You may also need to delete your computer's ARP table entry for the Prestige 2002's IP address (see above).

11.7 Problems with Telephone or Telephone Port

Table 33 Troubleshooting Telephone

PROBLEM	CORRECTIVE ACTION
The telephone port won't work or the telephone lacks a dial tone.	<p>Check the telephone connections and telephone wire.</p> <p>Make sure you have the VoIP screen properly configured.</p>

11.8 Problems with Voice Service

Table 34 Troubleshooting Voice Service

PROBLEM	CORRECTIVE ACTION
After the VoIP is configured and working, others are unable to call you or you lose your connection during a call. There is a NAT router between the Prestige and the SIP server.	<p>This could be caused by a short NAT UDP session timeout on the NAT router. When the SIP session's entry in the NAT table times out, the NAT router does not have any record to use for forwarding VoIP traffic to the Prestige.</p> <p>If possible, set the NAT router to use a longer NAT UDP session timeout.</p> <p>Otherwise, try one of the following:</p> <ul style="list-style-type: none">• Shorten the registration expiration period (see the Expiration Duration field in the VoIP Advanced screen) in order to cause the Prestige to re-register with the SIP register server more frequently. Note that this will not help if the SIP register server enforces a long registration expiration period (since the Prestige will also use the period set by the SIP register server).• Use STUN. If your VoIP service provider does not have a STUN server, you can still enable STUN and enter the IP address and port number of the SIP server in the STUN server fields. This causes the Prestige to send STUN requests to the SIP server. While this will not make STUN work (since there won't be any responses to the STUN requests), it should keep the NAT UDP session in the NAT router.

Appendix A

Hardware Specifications

Ethernet Port Specifications

10/100Mbps Half / Full Auto-negotiation, Auto-crossover

Prestige 2002 Power Adaptor Specifications

Table 35 Prestige 2002 Power Adaptor Specifications

NORTH AMERICAN PLUG STANDARDS	
AC Power Adapter Model	DV-1215A
Input Power	AC120Volts/60Hz/30W
Output Power	AC12Volts/1.25A
Power Consumption	11 W
Safety Standards	UL, CUL, CSA (UL 1310, CSA C22.2 No.223)
NORTH AMERICAN PLUG STANDARDS	
AC Power Adapter Model	AA-121A25
Input Power	AC120Volts/60Hz/19W
Output Power	AC 12Volts/ 1.25A
Power Consumption	11W
Safety Standards	UL, CUL (UL 1310, CSA C22.2 No.223)
EUROPEAN PLUG STANDARDS	
AC Power Adapter Model	AA-121A3BN
Input Power	AC230Volts/50Hz/140mA
Output Power	AC12Volts/1.3A
Power Consumption	11W
Safety Standards	ITS-GS, CE (EN 60950)

Prestige 2002L Power Adaptor Specifications

Table 36 Prestige 2002L Power Adaptor Specifications

NORTH AMERICAN PLUG STANDARDS	
AC Power Adapter Model	DV-1215A
Input Power	AC120Volts/60Hz/30W
Output Power	AC12Volts/1.25A
Power Consumption	14 W
Safety Standards	UL, CUL, CSA (UL 1310, CSA C22.2 No.223)
NORTH AMERICAN PLUG STANDARDS	
AC Power Adapter Model	AA-121A25
Input Power	AC120Volts/60Hz/19W
Output Power	AC 12Volts/ 1.25A
Power Consumption	14W
Safety Standards	UL, CUL (UL 1310, CSA C22.2 No.223)
EUROPEAN PLUG STANDARDS	
AC Power Adapter Model	AA-121A3BN
Input Power	AC230Volts/50Hz/140mA
Output Power	AC12Volts/1.3A
Power Consumption	14W
Safety Standards	ITS-GS, CE (EN 60950)
UNITED KINGDOM PLUG STANDARDS	
AC Power Adapter Model	AA-121A3D
Input Power	AC230Volts/50Hz/140mA
Output Power	AC12Volts/1.3A
Power Consumption	14W
Safety Standards	ITS-GS, CE (EN 60950)

Appendix B

Setting up Your Computer's IP Address

All computers must have a 10M or 100M Ethernet adapter card and TCP/IP installed.

Windows 95/98/Me/NT/2000/XP, Macintosh OS 7 and later operating systems and all versions of UNIX/LINUX include the software components you need to install and use TCP/IP on your computer. Windows 3.1 requires the purchase of a third-party TCP/IP application package.

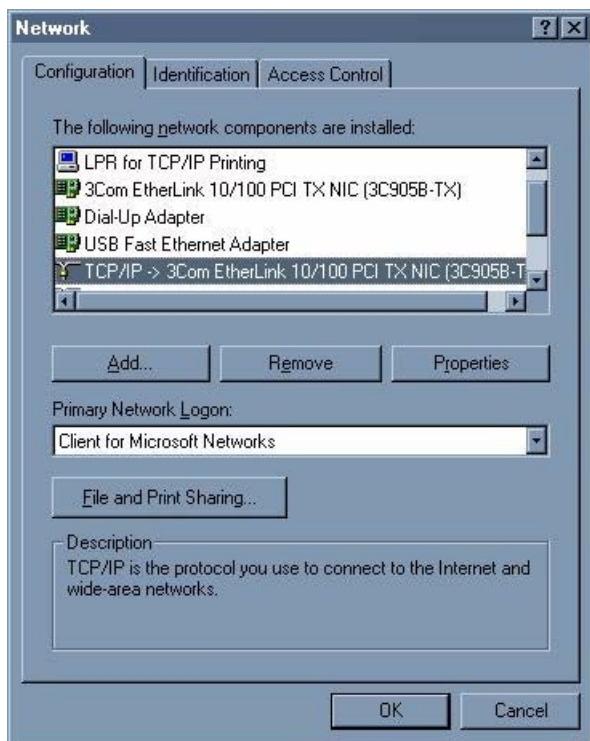
TCP/IP should already be installed on computers using Windows NT/2000/XP, Macintosh OS 7 and later operating systems.

After the appropriate TCP/IP components are installed, configure the TCP/IP settings in order to "communicate" with your network.

If you manually assign IP information instead of using dynamic assignment, make sure that your computers have IP addresses that place them in the same subnet as the Prestige's LAN port.

Windows 95/98/Me

Click **Start**, **Settings**, **Control Panel** and double-click the **Network** icon to open the **Network** window

Figure 38 Windows 95/98/Me: Network: Configuration

Installing Components

The **Network** window **Configuration** tab displays a list of installed components. You need a network adapter, the TCP/IP protocol and Client for Microsoft Networks.

If you need the adapter:

- 1** In the **Network** window, click **Add**.
- 2** Select **Adapter** and then click **Add**.
- 3** Select the manufacturer and model of your network adapter and then click **OK**.

If you need TCP/IP:

- 1** In the **Network** window, click **Add**.
- 2** Select **Protocol** and then click **Add**.
- 3** Select **Microsoft** from the list of **manufacturers**.
- 4** Select **TCP/IP** from the list of network protocols and then click **OK**.

If you need Client for Microsoft Networks:

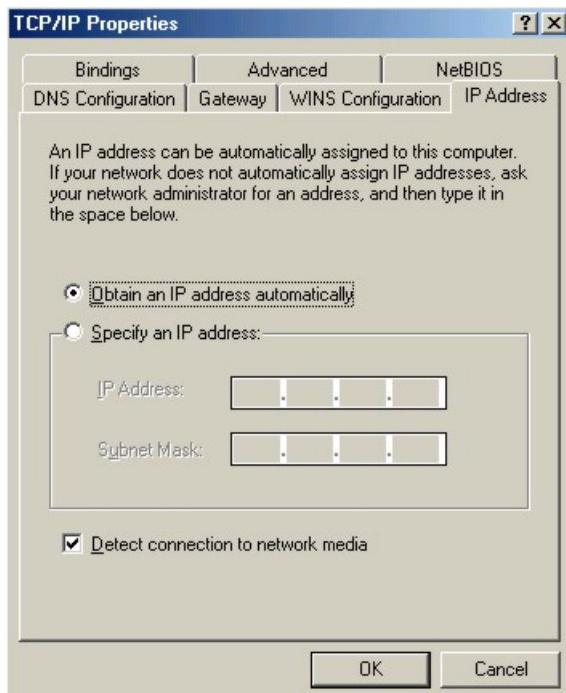
- 1** Click **Add**.
- 2** Select **Client** and then click **Add**.

- 3** Select **Microsoft** from the list of manufacturers.
- 4** Select **Client for Microsoft Networks** from the list of network clients and then click **OK**.
- 5** Restart your computer so the changes you made take effect.

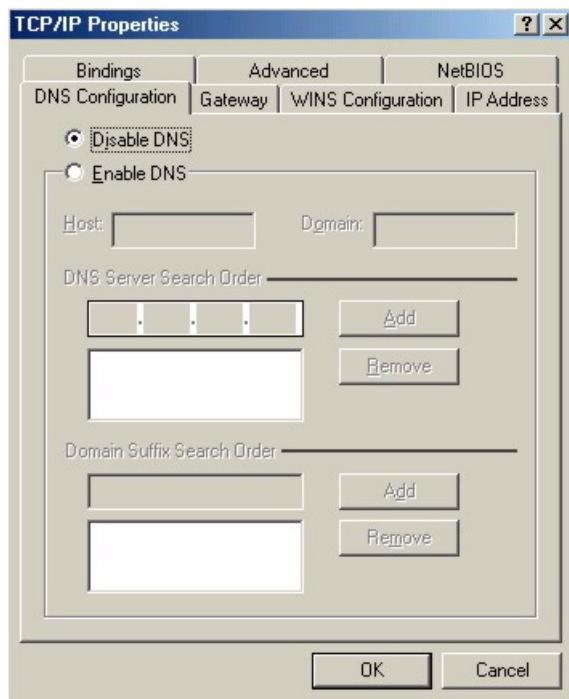
Configuring

- 1** In the **Network** window **Configuration** tab, select your network adapter's TCP/IP entry and click **Properties**
- 2** Click the **IP Address** tab.
 - If your IP address is dynamic, select **Obtain an IP address automatically**.
 - If you have a static IP address, select **Specify an IP address** and type your information into the **IP Address** and **Subnet Mask** fields.

Figure 39 Windows 95/98/Me: TCP/IP Properties: IP Address



- 3** Click the **DNS Configuration** tab.
 - If you do not know your DNS information, select **Disable DNS**.
 - If you know your DNS information, select **Enable DNS** and type the information in the fields below (you may not need to fill them all in).

Figure 40 Windows 95/98/Me: TCP/IP Properties: DNS Configuration

4 Click the **Gateway** tab.

- If you do not know your gateway's IP address, remove previously installed gateways.
- If you have a gateway IP address, type it in the **New gateway** field and click **Add**.

5 Click **OK** to save and close the **TCP/IP Properties** window.

6 Click **OK** to close the **Network** window. Insert the Windows CD if prompted.

7 Turn on your Prestige and restart your computer when prompted.

Verifying Settings

- 1 Click **Start** and then **Run**.
- 2 In the **Run** window, type "winipcfg" and then click **OK** to open the **IP Configuration** window.
- 3 Select your network adapter. You should see your computer's IP address, subnet mask and default gateway.

Windows 2000/NT/XP

- 1 For Windows XP, click **start**, **Control Panel**. In Windows 2000/NT, click **Start**, **Settings**, **Control Panel**.

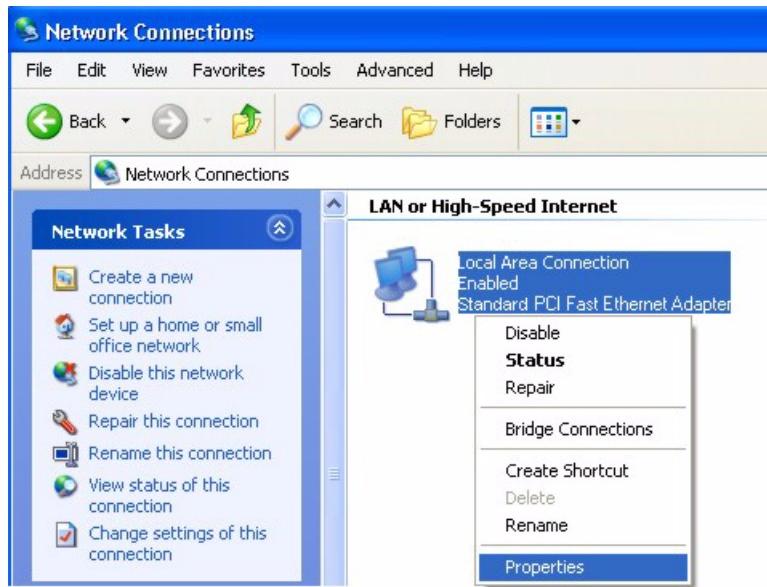
Figure 41 Windows XP: Start Menu

2 For Windows XP, click **Network Connections**. For Windows 2000/NT, click **Network and Dial-up Connections**.

Figure 42 Windows XP: Control Panel

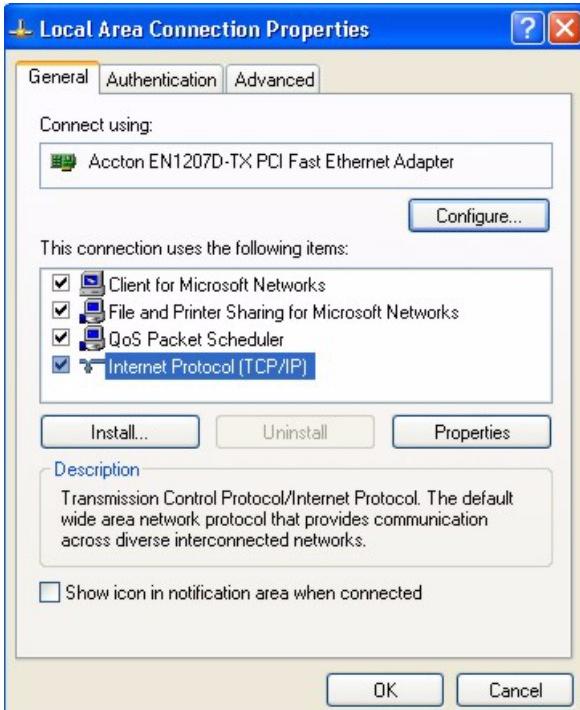
3 Right-click **Local Area Connection** and then click **Properties**.

Figure 43 Windows XP: Control Panel: Network Connections: Properties



- 4** Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.

Figure 44 Windows XP: Local Area Connection Properties

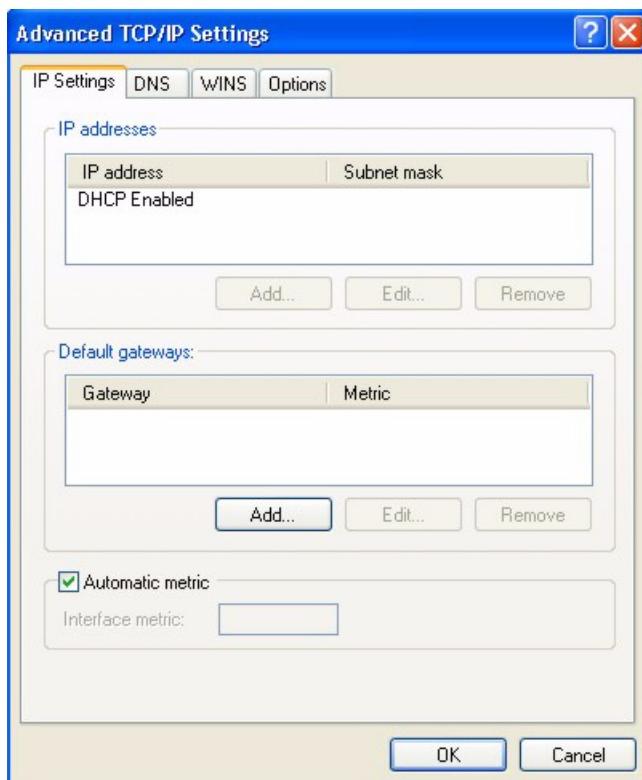


- 5** The **Internet Protocol TCP/IP Properties** window opens (the **General** tab in Windows XP).

- If you have a dynamic IP address click **Obtain an IP address automatically**.

- If you have a static IP address click **Use the following IP Address** and fill in the **IP address**, **Subnet mask**, and **Default gateway** fields. Click **Advanced**.

Figure 45 Windows XP: Advanced TCP/IP Settings



- 6** If you do not know your gateway's IP address, remove any previously installed gateways in the **IP Settings** tab and click **OK**.

Do one or more of the following if you want to configure additional IP addresses:

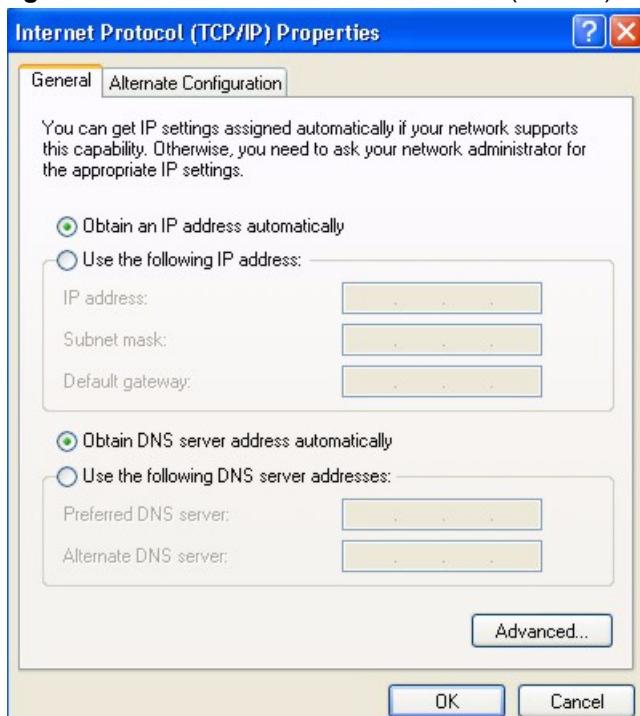
- In the **IP Settings** tab, in IP addresses, click **Add**.
- In **TCP/IP Address**, type an IP address in **IP address** and a subnet mask in **Subnet mask**, and then click **Add**.
- Repeat the above two steps for each IP address you want to add.
- Configure additional default gateways in the **IP Settings** tab by clicking **Add** in **Default gateways**.
- In **TCP/IP Gateway Address**, type the IP address of the default gateway in **Gateway**. To manually configure a default metric (the number of transmission hops), clear the **Automatic metric** check box and type a metric in **Metric**.
- Click **Add**.
- Repeat the previous three steps for each default gateway you want to add.
- Click **OK** when finished.

7 In the **Internet Protocol (TCP/IP) Properties** window (the **General** tab in Windows XP):

- Click **Obtain DNS server address automatically** if you do not know your DNS server IP address(es).
- If you know your DNS server IP address(es), click **Use the following DNS server addresses**, and type them in the **Preferred DNS server** and **Alternate DNS server** fields.

If you have previously configured DNS servers, click **Advanced** and then the **DNS** tab to order them.

Figure 46 Windows XP: Internet Protocol (TCP/IP) Properties



8 Click **OK** to close the **Internet Protocol (TCP/IP) Properties** window.

9 Click **OK** to close the **Local Area Connection Properties** window.

10 Turn on your Prestige and restart your computer (if prompted).

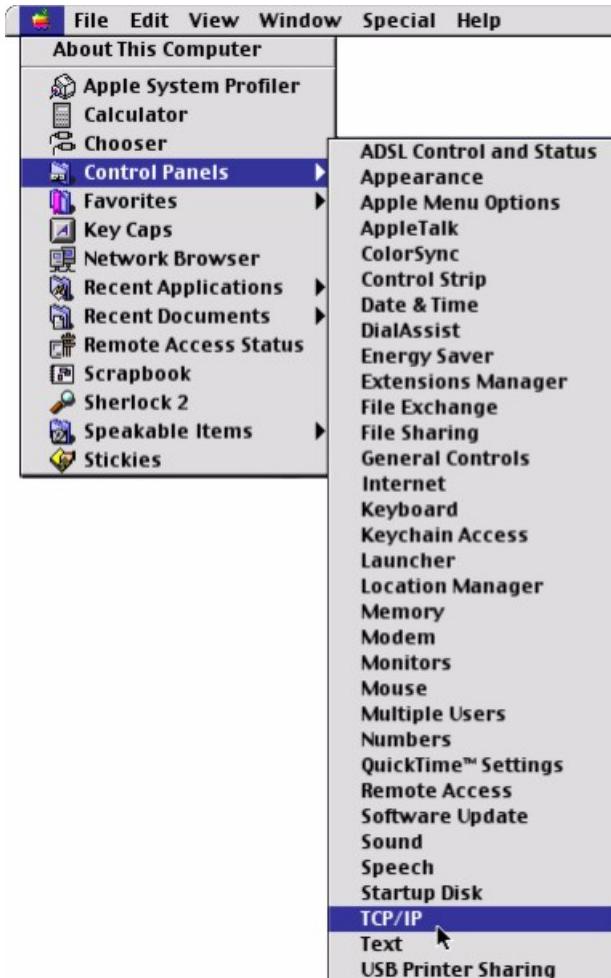
Verifying Settings

- 1 Click **Start**, **All Programs**, **Accessories** and then **Command Prompt**.
- 2 In the **Command Prompt** window, type "ipconfig" and then press [ENTER]. You can also open **Network Connections**, right-click a network connection, click **Status** and then click the **Support** tab.

Macintosh OS 8/9

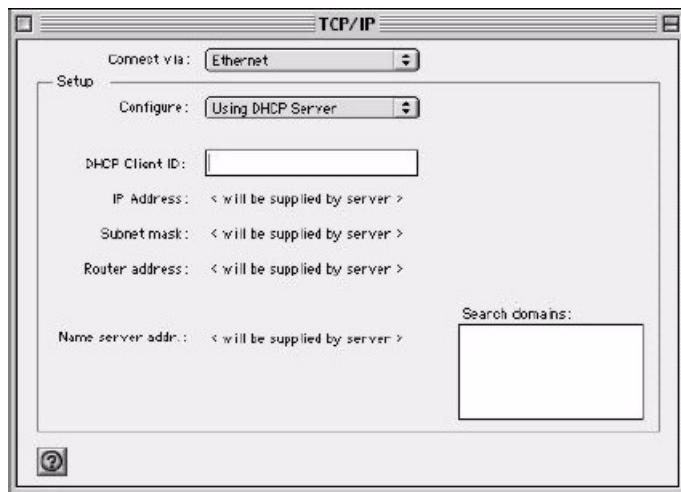
- 1 Click the **Apple** menu, **Control Panel** and double-click **TCP/IP** to open the **TCP/IP Control Panel**.

Figure 47 Macintosh OS 8/9: Apple Menu



- 2 Select **Ethernet built-in** from the **Connect via** list.

Figure 48 Macintosh OS 8/9: TCP/IP



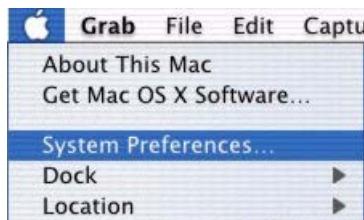
- 3** For dynamically assigned settings, select **Using DHCP Server** from the **Configure:** list.
- 4** For statically assigned settings, do the following:
 - From the **Configure** box, select **Manually**.
 - Type your IP address in the **IP Address** box.
 - Type your subnet mask in the **Subnet mask** box.
 - Type the IP address of your Prestige in the **Router address** box.
- 5** Close the **TCP/IP Control Panel**.
- 6** Click **Save** if prompted, to save changes to your configuration.
- 7** Turn on your Prestige and restart your computer (if prompted).

Verifying Settings

Check your TCP/IP properties in the **TCP/IP Control Panel** window.

Macintosh OS X

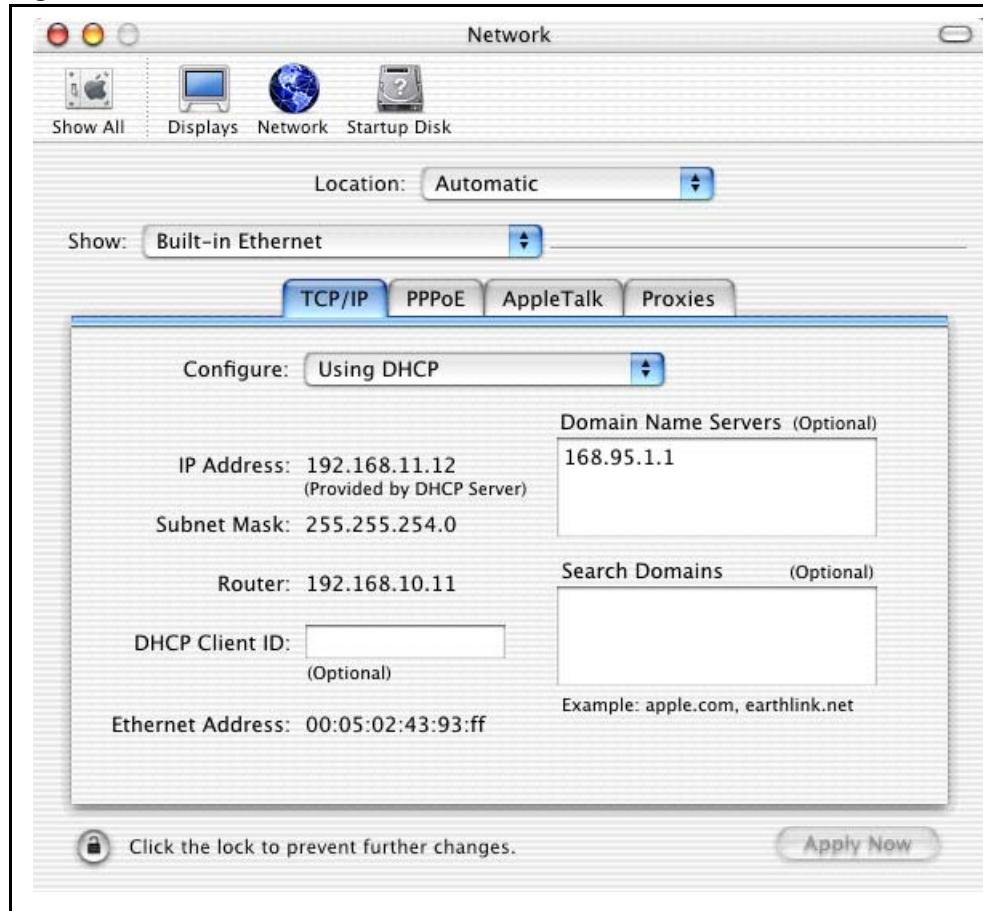
- 1** Click the **Apple** menu, and click **System Preferences** to open the **System Preferences** window.

Figure 49 Macintosh OS X: Apple Menu

2 Click Network in the icon bar.

- Select Automatic from the Location list.
- Select Built-in Ethernet from the Show list.
- Click the TCP/IP tab.

3 For dynamically assigned settings, select Using DHCP from the Configure list.

Figure 50 Macintosh OS X: Network

4 For statically assigned settings, do the following:

- From the Configure box, select Manually.
- Type your IP address in the IP Address box.
- Type your subnet mask in the Subnet mask box.
- Type the IP address of your Prestige in the Router address box.

- 5** Click **Apply Now** and close the window.
- 6** Turn on your Prestige and restart your computer (if prompted).

Verifying Settings

Check your TCP/IP properties in the **Network** window.

Appendix C

IP Subnetting

IP Addressing

Routers “route” based on the network number. The router that delivers the data packet to the correct destination host uses the host ID.

IP Classes

An IP address is made up of four octets (eight bits), written in dotted decimal notation, for example, 192.168.1.1. IP addresses are categorized into different classes. The class of an address depends on the value of its first octet.

- Class “A” addresses have a 0 in the left most bit. In a class “A” address the first octet is the network number and the remaining three octets make up the host ID.
- Class “B” addresses have a 1 in the left most bit and a 0 in the next left most bit. In a class “B” address the first two octets make up the network number and the two remaining octets make up the host ID.
- Class “C” addresses begin (starting from the left) with 1 1 0. In a class “C” address the first three octets make up the network number and the last octet is the host ID.
- Class “D” addresses begin with 1 1 1 0. Class “D” addresses are used for multicasting. (There is also a class “E” address. It is reserved for future use.)

Table 37 Classes of IP Addresses

IP ADDRESS:		OCTET 1	OCTET 2	OCTET 3	OCTET 4
Class A	0	Network number	Host ID	Host ID	Host ID
Class B	10	Network number	Network number	Host ID	Host ID
Class C	110	Network number	Network number	Network number	Host ID

 **Note:** Host IDs of all zeros or all ones are not allowed.

Therefore:

A class “C” network (8 host bits) can have $2^8 - 2$ or 254 hosts.

A class “B” address (16 host bits) can have $2^{16} - 2$ or 65534 hosts.

A class “A” address (24 host bits) can have $2^{24} - 2$ hosts (approximately 16 million hosts).

Since the first octet of a class “A” IP address must contain a “0”, the first octet of a class “A” address can have a value of 0 to 127.

Similarly the first octet of a class “B” must begin with “10”, therefore the first octet of a class “B” address has a valid range of 128 to 191. The first octet of a class “C” address begins with “110”, and therefore has a range of 192 to 223.

Table 38 Allowed IP Address Range By Class

CLASS	ALLOWED RANGE OF FIRST OCTET (BINARY)	ALLOWED RANGE OF FIRST OCTET (DECIMAL)
Class A	00000000 to 01111111	0 to 127
Class B	10000000 to 10111111	128 to 191
Class C	11000000 to 11011111	192 to 223
Class D	11100000 to 11101111	224 to 239

Subnet Masks

A subnet mask is used to determine which bits are part of the network number, and which bits are part of the host ID (using a logical AND operation). A subnet mask has 32 bits. If a bit in the subnet mask is “1” then the corresponding bit in the IP address is part of the network number. If a bit in the subnet mask is “0” then the corresponding bit in the IP address is part of the host ID.

Subnet masks are expressed in dotted decimal notation just as IP addresses are. The “natural” masks for class A, B and C IP addresses are as follows.

Table 39 “Natural” Masks

CLASS	NATURAL MASK
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

Subnetting

With subnetting, the class arrangement of an IP address is ignored. For example, a class C address no longer has to have 24 bits of network number and 8 bits of host ID. With subnetting, some of the host ID bits are converted into network number bits. By convention, subnet masks always consist of a continuous sequence of ones beginning from the left most bit of the mask, followed by a continuous sequence of zeros, for a total number of 32 bits.

Since the mask is always a continuous number of ones beginning from the left, followed by a continuous number of zeros for the remainder of the 32 bit mask, you can simply specify the number of ones instead of writing the value of each octet. This is usually specified by writing a “/” followed by the number of bits in the mask after the address.

For example, 192.1.1.0 /25 is equivalent to saying 192.1.1.0 with mask 255.255.255.128.

The following table shows all possible subnet masks for a class “C” address using both notations.

Table 40 Alternative Subnet Mask Notation

SUBNET MASK IP ADDRESS	SUBNET MASK “1” BITS	LAST OCTET BIT VALUE
255.255.255.0	/24	0000 0000
255.255.255.128	/25	1000 0000
255.255.255.192	/26	1100 0000
255.255.255.224	/27	1110 0000
255.255.255.240	/28	1111 0000
255.255.255.248	/29	1111 1000
255.255.255.252	/30	1111 1100

The first mask shown is the class “C” natural mask. Normally if no mask is specified it is understood that the natural mask is being used.

Example: Two Subnets

As an example, you have a class “C” address 192.168.1.0 with subnet mask of 255.255.255.0.

Table 41 Two Subnets Example

	NETWORK NUMBER	HOST ID
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	00000000
Subnet Mask	255.255.255.	0
Subnet Mask (Binary)	11111111.11111111.11111111.	00000000

The first three octets of the address make up the network number (class “C”). You want to have two separate networks.

Divide the network 192.168.1.0 into two separate subnets by converting one of the host ID bits of the IP address to a network number bit. The “borrowed” host ID bit can be either “0” or “1” thus giving two subnets; 192.168.1.0 with mask 255.255.255.128 and 192.168.1.128 with mask 255.255.255.128.



Note: In the following charts, shaded/bolded last octet bit values indicate host ID bits “borrowed” to form network ID bits. The number of “borrowed” host ID bits determines the number of subnets you can have. The remaining number of host ID bits (after “borrowing”) determines the number of hosts you can have on each subnet.

Table 42 Subnet 1

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	00000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.11111111.11111111.	10000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

Table 43 Subnet 2

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	10000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.11111111.11111111.	10000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

The remaining 7 bits determine the number of hosts each subnet can have. Host IDs of all zeros represent the subnet itself and host IDs of all ones are the broadcast address for that subnet, so the actual number of hosts available on each subnet in the example above is $2^7 - 2$ or 126 hosts for each subnet.

192.168.1.0 with mask 255.255.255.128 is the subnet itself, and 192.168.1.127 with mask 255.255.255.128 is the directed broadcast address for the first subnet. Therefore, the lowest IP address that can be assigned to an actual host for the first subnet is 192.168.1.1 and the highest is 192.168.1.126. Similarly the host ID range for the second subnet is 192.168.1.129 to 192.168.1.254.

Example: Four Subnets

The above example illustrated using a 25-bit subnet mask to divide a class “C” address space into two subnets. Similarly to divide a class “C” address into four subnets, you need to “borrow” two host ID bits to give four possible combinations of 00, 01, 10 and 11. The subnet mask is 26 bits (11111111.11111111.11111111.**11**000000) or 255.255.255.192. Each subnet contains 6 host ID bits, giving 2^6 -2 or 62 hosts for each subnet (all 0’s is the subnet itself, all 1’s is the broadcast address on the subnet).

Table 44 Subnet 1

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	00000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.63	Highest Host ID: 192.168.1.62	

Table 45 Subnet 2

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	64
IP Address (Binary)	11000000.10101000.00000001.	01000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.64	Lowest Host ID: 192.168.1.65	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

Table 46 Subnet 3

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	10000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.191	Highest Host ID: 192.168.1.190	

Table 47 Subnet 4

	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	192
IP Address (Binary)	11000000.10101000.00000001.	11000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.192	Lowest Host ID: 192.168.1.193	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

Example Eight Subnets

Similarly use a 27-bit mask to create 8 subnets (001, 010, 011, 100, 101, 110).

The following table shows class C IP address last octet values for each subnet.

Table 48 Eight Subnets

SUBNET	SUBNET ADDRESS	FIRST ADDRESS	LAST ADDRESS	BROADCAST ADDRESS
1	0	1	30	31
2	32	33	62	63
3	64	65	94	95
4	96	97	126	127
5	128	129	158	159
6	160	161	190	191
7	192	193	222	223
8	224	223	254	255

The following table is a summary for class “C” subnet planning.

Table 49 Class C Subnet Planning

NO. “BORROWED” HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.255.128 (/25)	2	126
2	255.255.255.192 (/26)	4	62
3	255.255.255.224 (/27)	8	30
4	255.255.255.240 (/28)	16	14
5	255.255.255.248 (/29)	32	6
6	255.255.255.252 (/30)	64	2
7	255.255.255.254 (/31)	128	1

Subnetting With Class A and Class B Networks.

For class “A” and class “B” addresses the subnet mask also determines which bits are part of the network number and which are part of the host ID.

A class “B” address has two host ID octets available for subnetting and a class “A” address has three host ID octets (see [Table 37](#)) available for subnetting.

The following table is a summary for class “B” subnet planning.

Table 50 Class B Subnet Planning

NO. “BORROWED” HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.128.0 (/17)	2	32766
2	255.255.192.0 (/18)	4	16382
3	255.255.224.0 (/19)	8	8190
4	255.255.240.0 (/20)	16	4094
5	255.255.248.0 (/21)	32	2046
6	255.255.252.0 (/22)	64	1022
7	255.255.254.0 (/23)	128	510
8	255.255.255.0 (/24)	256	254
9	255.255.255.128 (/25)	512	126
10	255.255.255.192 (/26)	1024	62
11	255.255.255.224 (/27)	2048	30
12	255.255.255.240 (/28)	4096	14
13	255.255.255.248 (/29)	8192	6
14	255.255.255.252 (/30)	16384	2
15	255.255.255.254 (/31)	32768	1

Appendix D

PPPoE

PPPoE in Action

An ADSL modem bridges a PPP session over Ethernet (PPP over Ethernet, RFC 2516) from your computer to an ATM PVC (Permanent Virtual Circuit) which connects to a DSL Access Concentrator where the PPP session terminates (see [Figure 51](#)). One PVC can support any number of PPP sessions from your LAN. PPPoE provides access control and billing functionality in a manner similar to dial-up services using PPP.

Benefits of PPPoE

PPPoE offers the following benefits:

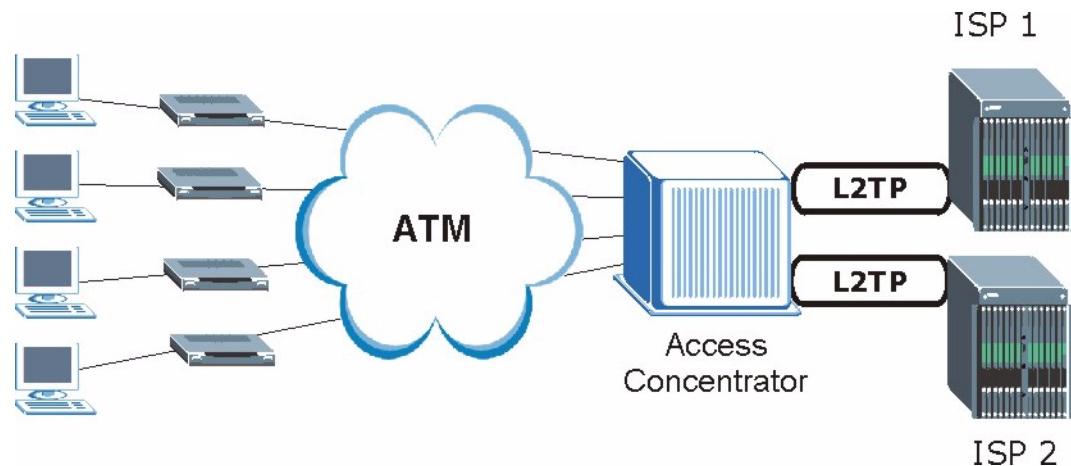
It provides you with a familiar dial-up networking (DUN) user interface.

It lessens the burden on the carriers of provisioning virtual circuits all the way to the ISP on multiple switches for thousands of users. For GSTN (PSTN and ISDN), the switching fabric is already in place.

It allows the ISP to use the existing dial-up model to authenticate and (optionally) to provide differentiated services.

Traditional Dial-up Scenario

The following diagram depicts a typical hardware configuration where the computers use traditional dial-up networking.

Figure 51 Single-Computer per Device Hardware Configuration

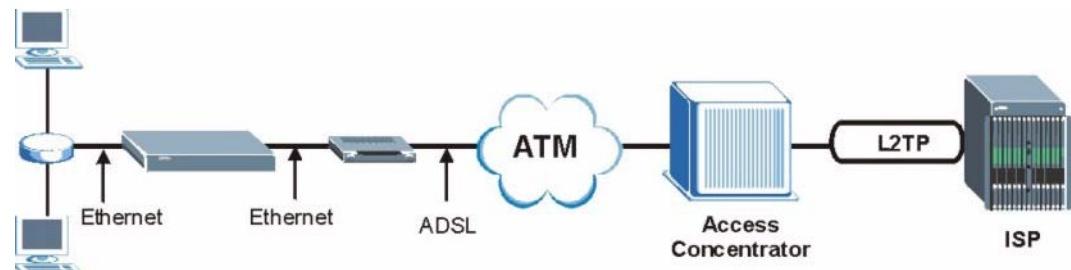
How PPPoE Works

The PPPoE driver makes the Ethernet appear as a serial link to the computer and the computer runs PPP over it, while the modem bridges the Ethernet frames to the Access Concentrator (AC). Between the AC and an ISP, the AC is acting as a L2TP (Layer 2 Tunneling Protocol) LAC (L2TP Access Concentrator) and tunnels the PPP frames to the ISP. The L2TP tunnel is capable of carrying multiple PPP sessions.

With PPPoE, the VC (Virtual Circuit) is equivalent to the dial-up connection and is between the modem and the AC, as opposed to all the way to the ISP. However, the PPP negotiation is between the computer and the ISP.

Prestige as a PPPoE Client

When using the Prestige as a PPPoE client, the computers on the LAN see only Ethernet and are not aware of PPPoE. This alleviates the administrator from having to manage the PPPoE clients on the individual computers.

Figure 52 Prestige as a PPPoE Client

Index

Numerics

64kbps **50**
8kbps **50**

Configuration Screen **66**
Configuration Upload Successful **68**
Copyright **3**
CoS **51**
Customer Support **6**

A

Abs **46**
ACK Message **40**
Administrator Inactivity Timer **30**
ALG **46**
Alternative Subnet Mask Notation **91**
Analog Telephone Adaptor **17**
Analysis-by-Synthesis **46**
Application Layer Gateway **46**
ATA **17**
Authentication Password **48**
Authentication User ID **48**
Auto-crossover **17**
Auto-crossover 10/100 Mbps Ethernet LAN **17**
Auto-negotiating **17**
Auto-provisioning **19**

B

Backup Configuration **67**
BYE Request **40**

C

Caller ID **48**
Class of Service **51**
Class of Service (CoS) **51**
Client-server Protocol **40**
Codec **46, 50**
Codecs **18**
Coder/Decoder **46, 50**
Computer Name **29**

D

Date **33**
Daylight Savings **33**
Default Password **23**
DHCP **29**
DHCP Clients **29**
Differentiated Services **51**
DiffServ **51**
DiffServ Code Point (DSCP) **51**
DiffServ Code Points **51**
DiffServ marking rule **51**
DNS **35, 37**
DNS Server Address Assignment **35**
DNS Servers **37**
Domain Name **29, 30, 35**
Domain Name System **37**
DS Field **51**
DS field **51**
DSCPs **51**
Dynamic Jitter Buffer **18**

E

Echo Cancellation **19, 53**
Emergency Numbers **55**
Ethernet **35**
ETHERNET Screen **36**
Expiration Duration **49**
External IP Addresses **42**

F

F/W Upload Screen **64**
Factory Defaults **68**
Fax **19**
FCC **4**
Firmware **64**
Firmware Upgrades **19**
Firmware Upload Error **66**
Firmware Upload In Process **66**
Full Cone NAT **43**

G

G.168 **53**
G.168 Active **54**
G.711 **18, 46, 50**
G.729 **18, 46, 50**
General Setup **29**
Get IP Address Automatically **37**

H

Host **31**
Host IDs **89**
HTTP **64**
Hypertext Transfer Protocol **64**

I

IEEE 802.1Q VLAN **52**
IETF **36**
Internal IP Addresses **42**
Internet Access Setup **72**
Internet Engineering Task Force **36**
Internet Explorer **23**
Internet Protocol Private Branch Exchange **20**
Internet Telephony Service Provider **19**
IP Address **23, 35**
IP Addressing **89**
IP Classes **89**
IP-PBX **20**
ITSP **19**
ITU-T **53**

J

JavaScript **23**
Jitter Buffer **18**

L

LAN Ethernet Port **35**
LAN LED **71**
Lifeline **17, 55**
Lifeline Screen **57**
Listening Port **48, 50**
Listening Volume **54**
Logs **59**

M

Maintenance **63**
Management IP Address **23**
Mgmt Port Screen **38**
Min-SE **50**
Model **64**
Model Name **64**
Multimedia **39**
Multiple SIP Accounts **18**
Multiple Voice Channels **18**

N

NAT **42**
Full Cone **43**
Port Restricted Cone **44**
Restricted Cone **44**
NAT Routers **42**
NAT Types **43**
Netscape Navigator **23**
Network Address Translators **42**
Network Temporarily Disconnected **66, 68**
Non-Proxy **56**
NTP Time Servers **31**

O

OK Response **40**
Outgoing Call use **54**

R

Register **64**
Register Resend Timer **49**
REGISTER Server Address **48**
REGISTER Server Port **48**
Related Documentation **15**
Relay to PSTN **57**

REN

18
RESET Button **25**

Reset button **68**

Reset Warning Message **69**

Restart Screen **69**

Restore Configuration **67**

Restricted Cone NAT **44**

RFC 1305 **32**

RFC 1889 **18, 42**

RFC 189 **18**

RFC 2327 **18**

RFC 3261 **18**

RFC 3489 **18, 42**

RFC 867 **32**

RFC 868 **32**

Ringer Equivalence Number **18**

RTCP **18**

RTP **18, 42**

RTP Port Range **50**

Password **23, 30**
PC Ethernet Port **35**
PC LED **71**
PCM **46**
Per-Hop Behavior **51**
PHB (Per-Hop Behavior) **51**
PHONE 1 and 2 Ports **48**
Phone Book **55**
Phone Port Screen **54**
Phone Port Settings **54**
Phone Settings. **53**
Point-to-Point Protocol over Ethernet **36**
Port **42**
Port Restricted Cone NAT **44**
PPPoE **36, 97**
PPPoE User Name **37**
PPTP **36**
Pre-defined NTP Time Servers List **31**
Preferred Codec **50**
Prestige 2002L **17**
Private IP Addresses **42**
PSTN **17**
PSTN Pre-fix Number **57**
Public IP Addresses **42**
Public Switched Telephone Network **17**
Pulse Code Modulation **46**

Q

QoS **19, 51, 52**
Quality of Service **19, 51**
Quality of Service (QoS) **19**
Quick Start Guide **23**

R

Real time Transport Protocol **42, 50**

S

Screen Resolution **23**
SDP **18**
Server **32**
Service **5**
Service Type **72**
Session Expires **49**
Session Initiation Protocol **39**
SIP **39**
SIP Account **39, 48**
SIP ALG **46**
SIP Application Layer Gateway **46**
SIP Call Progression **40**
SIP Client **40**
SIP Identities **39**
SIP INVITE Request **40**
SIP Local Port **48**
SIP Number **39, 48, 56**
SIP Proxy Server **41**
SIP Redirect Server **41**
SIP Register Server **42**

SIP Registration Status **64**
SIP Server Address **48**
SIP Server Port **48**
SIP Servers **40**
SIP Service Domain **39, 48**
SIP URI **39, 56**
SIP User Agent Server **40**
SIP Version 2 **18**
Speaking Volume **54**
Speed Dial **55, 56**
Speed Dial Screen **55**
Status Screen **63**
STUN **18, 42, 50**
Subnet Mask **35**
Subnet Masks **90**
Subnetting **90**
Supporting Disk **15**
Symmetric NAT **45**
Syntax Conventions **16**
System Name **29, 30, 64**
SYSTEM Screens **29**

V
VID **52**
View Log Screen **59**
Virtual Local Area Network **51**
VLAN **51**
VLAN Group **52**
VLAN ID **52**
VLAN ID Tags **52**
VLAN Tag **52**
Voice Coding **18, 46**
Voice Priority **52**
Voice VLAN ID **52**
VoIP **39**
VoIP Advanced Screen **49**
VoIP Screen **47**
VoIP Status **64**

W

Web Configurator **23, 25**

T

Time **32**
Time Protocol **32**
Time Server **32**
Time Zone **32, 33**
ToS **51**
Troubleshooting **71**
Type Of Service **51**
Type of Service **52**

Z

ZyNOS Firmware Version **64**
ZyXEL Limited Warranty
Note **5**

U

Uniform Resource Identifier **39**
Unregister **64**
URL Type **49**
Use Fixed IP Address **37**
Use PPPoE Client **37**
Use Proxy **56**
Used Port **64**